

Commodore **HORIZONS**

The independent Commodore magazine

75p February 1984

**DISK DRIVES SURVEYED • SOFTWARE REVIEWED
MATHEMATICAL LOGIC ON THE VIC AND 64**

AIR WAR SPECIAL



PLAY ALIEN
ATTACK ON
THE VIC
AND PLANE
ON THE 64



**WIN
PRINTER/PLOTTER
FROM THE 64
SUPPLIES
COMPANY**

EXPLORE
NEW FRONTIERS OF FUN
WITH

AudioGenic

From single classics like "AMIGAS" and "ALIEN CLITE" to the latest releases like
"KARTUS" and "SMITH'S MARYA".

From Matthew Cide Arcade Action through Graphical Adventure to (New)
Ben Ray, Ryan Games - WE'VE GOT THE LOT!

The only CD-ROMs you can find in the world of AudioGenic
which are not just CD-ROMs, but also CD-ROMs.

AUDIOGENIC, P.O. BOX 10, LEADING, P.O. BOX 10, LEADING



MORE THAN JUST A GAME...

Commodore HORIZONS

(An International Commodore Magazine)

Editor

Graham Cunningham

Assistant Editor

Christopher Jenkins

Reviews Editor

Graham Taylor

National Secretary

Claire Cherry

Advertisement Manager

David Lusk

Advertisement Executive

Joanley Kato

Administration

Theresa Lutz

Managing Editor

Duncan Sells

Publishing Director

Joanley Kato

Telephone Number

(all departments)

01-417 4544

Address

Commodore Horizons, 1211 Little
Newport Street, London WC2N 6LD

Subscriptions

UK: £10.00 for 12 issues, overseas
subscribers including US and Canada
£18.00 for 12 issues, US and Canada in-
cluded US\$20.00 for 12 issues

Submitting articles

Commodore Horizons welcomes readers' contributions — either articles or program listings. Articles should be typed double spaced with a wide margin. Programs should, whenever possible, be printed on one page where possible, accompanied by a cassette. We cannot guarantee to return every article or program submitted, so please keep a copy. If you want to have your program returned you must include a stamped, addressed envelope.



Commodore Horizons is published monthly by Sunshine Books, 9, 11 Price Ltd, Tottenham, in the City, Unit 37, Haverhill Road, London E20 1PT. Printed by Haverhill Press Ltd, Haverhill Way, Waltham, Kent. Distributed by The Distribution Co, 18 Tennyson Gardens, London SW9 6NR telephone 01-274 8441, telex 261443, 0208 0201-1144. Registered at the Post Office as a newspaper. © Sunshine Books 1986

CONTENTS

Letters

A postal response to our last competition, problems with Turbo Pascal, and some Turbo programming tips

3

News

A powerful new graphics cable, the Turbo Printer, printers along with a selection of new musical hardware and software and a music exploration of music style games — plus all the latest on Commodore's new music

7

Software review

14



First Command: a serious look at the box — and the rest — of the various game software releases including Palace Patrol, ported drive

Disk drives discovered

19

In the dark about disk drives? Help is at hand in this discussion of drives which also explores the world of microfilm

Profile

Meet Jeff Meier, the programmer behind the new software Microplace Games

21

Clubs

David Amel introduces K.F.U.C.

23

Art and special

Play Along Attack on the Vic and Plus on the 64 (from cover by Susan Hughes)

26

Script programming

Three classic cut scenes put under the mic a script

30

Vic arithmetic

Two a week: a mental turning positive numbers negative, and other Vic delights

33

Software file

More varied programs from readers, with space games, singing birds, and a popular children's game reviewed

41

Keynote

How to specify which keys are valid during action from the keyboard

37

Answers back

Technical questions from our readers, tackled

55

Market view

What's new on the horizon at Commodore — market prospects

68

Competition

The 64 Spectator Competition gives you the chance to win a Commodore printer, plotter

38

EDITORIAL

OUR CAMPAIGN TO persuade most independent companies to produce Commodore software certainly struck a chord with many of our readers. But keep your fingers crossed — the more people who want to support us, the more pressure we can put on the software houses. And the higher number of potential purchasers we can point to, the more incentive will the proprietors have to undertake further

As we pointed out in our first issue there are very few firms producing Commodore software — particularly compared to the hundreds of small, innovative software firms producing original material for the Spectrum. We think it is time that these firms started producing software for the Commodore range of machines. If you agree then why not join us in our campaign to persuade Spectrum software houses to start writing for the Vic 30 and CBM 64?

Response to the launch of the campaign in our first issue was strong, with only one person dissenting. That reader thought there was no need for the campaign, and that we should instead be supporting those companies who have already put time and investment into writing Commodore software. We have an admission of exactly their complaint — at each issue we'll be reviewing the latest software available and, at the time we'll be trying to give readers an idea of what there is to be found. However so that we're not criticised by the reader's arguments, and the rest of the letters received in support of the point made by most readers was that they machines were superb but the range of software available was not. To such one response is common: "What ought to be done is for someone to adopt a more positive attitude to the extensive potential of the 64, if therefore support new presentations to software houses to maximize and vary software availability." And another: "On assuming the software available, I find myself in total agreement with your editorial. Despite our potential the 64 would appear to be inadequately served by the software houses."

The reader added: "There are relatively few games available and totally no educational software. So, please more educational software for pre-64 level, and some software — any — on the drugs." In fact the main comment my was for educational software, although there also seems to be a need for small business programs. Some requests were very specific — one "where can I" especially long to get a good version of Euclyde. Whatever your needs if you want more from, independent software for the Vic 30 and CBM 64 — write to us and let us know — we'll make sure your views are heard

Home
Computer
Centre



39 Midcourt, Clonmel, Co. Wick. L23 9XJ
Tel. 051 197 8856

ASTERNET TRADING LTD. INCORPORATES
HOME COMPUTER CENTRE

**SPECIAL
OFFER**

VIC 20 and CBM 64 are not officially endorsed
Commodore Business Machines

RAM PACKS

- | | |
|-----------------------|----------|
| VIC 20 16K STANDARD | — £27.95 |
| VIC 20 16K SWITCHABLE | — £35.95 |
| VIC 20 32K SWITCHABLE | — £49.95 |

RAM-PACK

**16K STANDARD
£27.95**

MOTHERBOARDS

- | | |
|--------------------------|----------|
| VIC 20 4 SLOT SWITCHABLE | — £28.95 |
| CBM 64 4 SLOT SWITCHABLE | — £29.95 |

LIGHT PENS

- | | | |
|--------|-------------|----------|
| BBC | + FREE GAME | — £28.75 |
| CBM 64 | + FREE GAME | — £28.75 |
| VIC 20 | + FREE GAME | — £28.75 |

Please allow up to 21 days for delivery. All prices include V.A.T. (printer and packing)

If you wish to be added to our mail list, in
please tick the appropriate box

PLEASE SEND ME

Do

- ☐ VIC 20
☐ CMB 64
☐ BBC
☐ Lynx
☐ Dragon 32
☐ ZX Spectrum
☐ Electron

- ☐ 16K Std Ram Pack
☐ 16K Switchable Ram Pack
☐ 32K Switchable Ram Pack
☐ VIC 20 4 Slot Motherboard
☐ CMB 64 4 Slot Motherboard
☐ Vic 20 Light Pen
☐ CMB 64 Light Pen
☐ BBC Light Pen

Name _____
Address _____

I enclose Cheques (PG) for £ _____

Home
Computer
Centre



LETTERS PAGE

Competition cornered

In response to the wonderful problem in your Commodore Corner, may I list the following composer: five major lands, oceans and waters; five programs; great would two words: A floppy drive worth several good To give someone to a bed To solve a puzzle, what you where Who owns the attack by the chair? And what is it that causes the The program of money such TV?

Each has a peripheral, only one To make their program last on line, A joystick, video box, printer pen That's lost, so now let's think again, A floppy reader, those that'll find! So what happens in that camera door? That extra gadget stays in an Attachment, we can tell you how. Minor Roberts problem with, Thought he'd make the reader better! That might work with one more,

On even Apple, Lisa, and more, Could solve it with a high speed score. He must be strong.

Commodore The plan of having to delete A few magnetic storage files

The price is not a giveaway Two hundred good is what you'll get,

Plus seven for price if you are not

By magazine who egg you on To you, how then, with your strong

When a price of you are waiting

By the day you're saved the sun

To buy your future, buy now!"

If passed in to Clark Hill Nook

Are treated often to your look

There's only one more thing to say

"Pardon me? He'll Not? O.k.?"

John Carter

Madison

Each

The computer recently moved a lot of problems

quartz due to its making up disks and computers — no printing to sort things out at Clark Hill Nook from now on

One reader suggested that the joystick belongs "in Horowitz, when told it there last week, and it was not

noticed among all the more

the needed in the last 1981

column but was of this week."

Like me, but wrong answer

A lot of people, however

have got it right so far, and we'll announce the winners and the names next month. In the meantime we'll try to think of an alternative prize for John's case.

Slick Vic tricks

CONGRATULATIONS on producing a first-class issue. It is the first time I have found a magazine with programs using the Super Diskeeper Plus on the Vic 20. It would be nice to see more.

Back numbers on page 41 worked fine once, great everything after so many other magazine programs residing in ERDOS IN.

Also both show programs produce interesting effects if Compiled 1 or 2 Sample programs but great fun. They look are nice and I enjoyed for a while. Thanks, otherwise Christopher Poole New Haven Hampshire

Chestnuts repeated

THE Material program in the first issue of Commodore Horowitz works well, but some points made in the last issue of Old Chestnuts.

Recent rep clarification Using shift & RUN STOP on load a program results in the program being automatically run after it is loaded. LOAD (program) does not.

Add programs to make the keys of the Vic 20 are unnecessary, because F00E 800 200 will make all keys repeat. F00E 000-0 will repeat on normal — RUN STOP RESUME will not.

Keep up the good work with the magazine. J. M. Demers Providence Rhode Island CT 018

Vicsoft vexations

AS A subscriber in small impression of Commodore Horowitz was responsible. Some of the things were very good. For example Apple

Poll Watch was itself to follow although it would have been helpful to have seen on the number of spots in various bars.

On the other hand the listing for the new Space was very poor, with the control codes being practically impossible to read.

You may be interested to know of the problems with Nicotrol. I intended to order some software on the 11th October. The goods were confirmed in stock and my Account card was debited on the 14th October. Despite numerous phone calls to find out what had happened only part of the goods arrived on 24th November. I have complained to Account about the changing of cards without dispatch of goods and I understand that this is contrary to instructions.

To my mind the choice of software at the moment is between the Spectrum, BBC B and IBM 64. The BBC costs too much. The Spectrum has a home keyboard and so saved out of the television, but lots of good programs. The Commodore was my choice except the poor basic — though if you get to grips with it you can probably manage writing. B. A. Riddell Essex Essex

POWELL takes about the Bellings — and let us know if Commodore will discuss taking the point about 4 words.

Take a tip

HERE'S some tips for Commodore 64 owners. F00E 800 200 doubles not-ramp and F00E 800 217 re-enables a F00E 717 200 doubles the low command and F00E 717 107 re-enables a Format. Nolan Bromley South Africa

This is the chance to air your views — send your tips, complaints and compliments to Letters Page. Commodore Horowitz, 15-15 Little Newport Street London WC2R 6LD



NEWS DESK

Following up Falcon

STEVEN LEE, 34-year-old author of *Falcon* Pined for the Commodore 64, is now plotting his next game.

Previously called *Helicon* (it will be released by Simon Guster at the end of January in a year), as the *Helicon* III of the title, must fight off a succession of attacks from evil wizards.

Steve is also working on a follow-up to *Falcon* Pined — probably *Falcon* Pined II. Using the basis of the original but with added features and a new more difficult location, the game is predicted to be tricky.

Speech built into new 364

THIS summer into the launch of a new Commodore home computer such built in speech, the 364 — and features not various may follow later.

At retail at built in speech, the 364 will offer 128K of system ROM, 64K of bank-switchable RAM, built-in speech control and a redesigned keyboard plus software keypad.

—The design is said to be more flexible making it easy to produce lower cost versions. For example, cutting down on the RAM and dropping the

speech module could produce a 332 or 318.

The good news is that the 364's ROM offers all the *Top Secret* Explorer commands. The bad news is that there are no disks, and that the 364 and 64 software will not run on the new machine.

The 364 was first seen at the version of *Base*, proof of

Commodore's business machines, as opposed to *Base* 2 on the *Vic* and the 64.

The new machine was shown for the first time at the Computer Electronics Show in Las Vegas at the beginning of January — causing a talking version of *Base* to appear.

It is expected to go into UK production this winter.

On the serious side of software

COMPANIES both large and small are being attracted to the market for software with serious applications — programs for use in business and in the laboratory.

Stonebridge-based Specific Software has released a series of book-keeping programs for the *Vic* and 64 while electronic giant ICI is looking for converts across the world.

Specific Software's suite of programs covers Inventory, Sales, Accounts and Purchase Accounts. Each is available on either tape or disk for both the 64 and a five 28-pin 16K RAM, although the features and range of functions vary according.

For example the tape-based version of *Sales Accounts* for the *Vic* costs 104, includes address label printing which is available on tape for the 64 and on disk for both machines.

Prices also vary accordingly — no Sales on tape for the *Vic* costs £15.00 but rises to £19.00 for *Vic* disks. The 64 tape version is £19.00 rising to £29.00 on disk — the inclusion of features such as cash analysis bookings.

Purchase Accounts has the same price structure but the inventory package costs from

£29.00 to £49.00.

The tape version, has a capacity of 64 accounts and 600 transactions while the disk, offer 600 accounts and up to 2,000 transactions.

ICI's three packages (Formal RSP and Diagrams) are being marketed under the *Corporate* title already used for digital output interfaces. For variants are available now, but do not have to wait until March.

Tomark at £450, is a manufacturing program which allows tasks to be written and stored individually before forcing them together within a common framework. There is no time limit. Tomark operates in real time processes changing parameters from moment to moment.

So far Tomark has been used in a number of laboratory experiments, but ICI expects applications to extend to industrial control and into the household/hobbyist market.

The two other programs have a more limited scope: RSP (the *Corporate* Statistical Package) is used for processing and analysing arrays of experimental data while Diagrams manages impact tests on materials.

Brush up on your painting



Koda Painter — Kromtek's answer to the paint pot.

SOFTWARE house Kromtek has moved into the peripherals market with the launch of a graphics tablet for the 64.

Called Koda Painter, the tablet allows users to produce full colour drawings and illustrations directly on a pen.

The £69.95 package consists of the graphics tablet plus separate driver, cable board software and an instruction manual.

The software gives you a

chromaticity scale — commands functions and then finally colour prints into off-set colour, of 16 shades and 16 patterns.

The command palette allows you to combine freehand drawings with precisely stored designs and lines, shapes included in the menu (lines, dots, arcs, etc).

And freedom from size is claimed to help the style of the illustration by zooming or decreasing line width.

Sounding off on the right notes

THE NEWS is good for music-loving 64 users.

Software house Quedius is releasing a music program, Ultratalk 64, at about \$19.99, while a keyboard has arrived from a new company, called Silym.

The Microsound 64, a full size four octave keyboard plugs into the 64's cartridge port.

Both software centers have departed an Microsound into musical notes played through the TR keyboard. They may also be stored in your 64, as stored in tape or disk, for reusing.

Microsound 64 also contains two other cartridges which operate a simple music synthesizer. And, Silym is developing more software containing the 1123 keyboard to produce more complex music at this time.

Microsound 64 is available from Acoustic, P.O. Box 10, Reading Rd. Haverhill, MA 01830.

Spectrum hits set for the 64

TWO OF last year's most popular games for the Sinclair Spectrum, Valtella and Music Miner, will soon be available for the CBM 64.

Valtella, the adventure from Legend Software which introduced the Microbot graphics animation process, will appear in February.

Legend's managing director John Poff commented: "The Commodore 64 version of the game will be similar to the Spectrum one, but obviously the graphics will be better. For one thing, the characters will be more than one colour, and we should also be able to do things with the background."

Like the Spectrum version, Valtella for the 64 will cost around £15, and the new release is expected to confirm its position as one of the most popular adventure games around.

Music Miner, the much-



For professional users, John Legend's Valtella adventure

resisted arcade-style game, should be an instant success in the same time. Software Projects' CMB 64 program is an almost exact copy of the original English version for the Spectrum reported as one of the best 48K Spectrum games released last year. In Music Miner the hero, Mike Willy, collects gems while avoiding attacks from central opponents. Each of the 20 screens has been recreated for

the CMB 64 version.

Project manager Chris Lancaster noted that the nature of the game was such that it wasn't thought necessary to radically redesign it for the 64, but there would be some changes in the control effects.

Chris had claimed the game would be well worth its estimated £7.95 price, and should be as addictive as the 64 as it has proved to be on the Spectrum.

Rounding up the arcade games

COMPETITION is undoubtedly the name of the game, make sure they have some arcade games on the market — and let their wits be employed.

Heading the pack of new releases were titles from Acutronics, Atari, Asarcsoft and Cometary-based P&G.

Acutronics launched its series of dual cartridges, with one side containing a Vic 20 program and the other a 64 version. First up were Candy on at £5.95 and the re-released Blast, at £3.95.

In Cactus you command Delious against defending the latter city of Boney from the armies of the Boney Empire. Future to discover the reasons for this.

Bone pits you in the role of a workman climbing ladders to collect bones from dragons, levels of the screen. The bones are guarded by monsters which Acutronics name, "do not put wonder about the screen but actually try to trap you on a particular level".

For the 64, extended Vic



P&G's Blast title — spot the items at speed

Acutronics, who launched Sifter which a preview makes Pat that look like the truly best game. The price of enjoying the game is £14.95.

Three new cartridges, Beposonic, Snatch, and Chop, library and new dual (David's) Beposonic Mages are aimed at 64 users. Each costs £14.95.

As Acutronics the machine threatens your aspects while eggs and traps also make good

appealments.

As a programmer of the best computer you have to develop a variety of traps. Chopped before the military theme has on land not at sea, a top pilot's helicopter to return trapped soldiers.

David's Beposonic Mages, however, presents the more subtle pleasure of playing parallel.

It is back to a world of mine

reclaim music in P&G. Its location included ideas that expelling the alien. Mike, Da, L. (moving up) (about 1000), Beposonic (moving the central planet) and Candy Spin (defeating the enemy).

The games from North America, one on the 64 and one £7.95 each.

You now had Atari's Tank Battle to battle. The scenario on all money runs of 1/4, and costs £3.95.

The next after more arcade Beposonic Acutronics conveyed some of the Atari games in cartridges to both the Vic and the 64.

Big Dog and Beposonic Acutronics come in at the top of the range at £19.99 each. Beposonic, Cometary and Defender cost £14.95 while Beposonic and Sifter are the cheapest at £10.95.

This also seems expensive, but Atari is sure that its games are "unconditional ones, therefore the price is not too high in terms of the quality which you get.

Solar SOFTWARE

31 Woodcock Road
Macclesfield M24 2UP
Tel 0562 254 8502

Quality arcade action games for the **COMMODORE 64**

GALAXIONS The earth is being invaded by an alien force, the GALAXIONS have arrived from a dying planet determined to destroy civilisation as we know it. They come in formation, swooping and diving towards the planet earth. You and you alone can save mankind from the terrifying destruction the aliens threaten as with:

100% Machine Code

3 Lives

Bonus ship at 10000

Progressive levels of play



£7.95

much man 64 A fantastic version of the popular arcade game

100% Machine Code

3 Lives Bonus fruit

Power play

4 Very intelligent ghosts



£7.95

Hobbit vs the Wizard In days of old when knights were bold and the sheriff was in power to play this game guide Robin Hood to Merion locked up in the tower

100% Machine Code

Sprite Graphics

3 Lives

12 Screens of arcade action



£7.95

All our games are available mail order P&P included from the above address. Orders sent by return post. Also available from all good computer shops.

Distribution, PROGRESSIVE London,
PC & Darwin, CENTRE SOFT West Midlands
ALPHA TAPES, Macclesfield TIGER, Cheshire.
CAUSTIC, Birmingham, LIGHTNING, London,
LEISURESOFT, Northampton.

Magic moments from Commodore

COMMODORE'S aimed on the software market continues this year, with Magic Voice, Magic Disk and Breakball — the follow up to Soccer — leading the charge.

Magic Voice, a speech synthesis unit at about £20, will be available early this year. It has a vocabulary of about 200 words, which is expanded by the standard SAY-IT.

Letters and numbers are also included along with some suffixes for adding to words.

A number of talking games and educational aids are also on their way to run with Magic Voice — the arcade game Wizard of War and Carl, a series of talking books for infant school children, and some pre-school packages

covering reading, arithmetic and thinking.

All groups of talking books can be used without Magic Voice.

For users at schools of education, can turn to the series of six First Peak programs.

The Magic Disk cartridge now expanded such that you can also be used with Magic Voice. This is a small business package using patterns to represent an office and its functions.

The first UK release, Magic Disk II offers typing, value buying and filing facilities.

Also on its way for 64 users is Breakball — a follow-up to the standard Soccer. This is expected to be available late spring.

Adventures away



Exotic Adventures: a wilderness challenge

COMMODORE plans a series of adventures are having their players serviced in two computers — 16-bit and Commodore 64.

Ray Ryan has released Twin Kingdom Valley for the 64. Combining text and graphics, the program is on the Hobbit mould with 177 screens.

After extensive English Software has gone underwriter for Neptune's Daughters — a multiple screen adventure for the 64 at £9.95.

Two other 64 titles come from Rockland Sheepfold Software, at £6.95 each.

Step of the Line takes you back to the 17th century and puts you at command of a Royal Navy warship chasing the Barbary pirates.

Live-on, Avoca brings you back up to date and sometimes down with a bang. As you

plot your way up the mountain you have to avoid wildcards, monsters, then are also immovable obstacles.

The fourth company is 656 where Knights of Zena, at £7.95, provides 64 users with route thrills as well.

Commodore itself has not forgotten 64 users. It plans to release a wide range of adventures as we revealed at our previous event.

These plans include more Sport Action titles on the 64 and 64 along with other celebrated American games for the 64. Chief among these are Superdroid, Deadzone and the Dark Intake — all from Telos.

If you think you've
something newsworthy
call 05-437 4340 and let
us know



VALHALLA

commodore games cassettes

SUPER SKRAMBLE!

Personal Computer News (11-21 Sept 83) gave **SUPER SKRAMBLE!** an overall grade of **NINETEEN OUT OF TWENTY** and described it as "One of the best with 16-bit fully smooth scrolling, and very nice graphics."

SUPER GREYDER

"A truly all-time piece of software that will give you a 'fix' when the world of Personal Computer News (21-27 Sept 83).

SUPER SKRAMBLE!

"An excellent game" said PCW. "V for Games magazine rated it."

STELLAR 1 & 2

A game of skill and strategy, which you must win by your way the computer is to win. New game. \$10.00.

NEW



NEW

SEVEN DROPPY

The first of the **ADVENTURE** series. **INTERVIEW** with **SCOTT** - leader of the team.

IN THE

A fun action game of which many awards have been won and which is a real **WAVE** FACT. \$10.00 each.

VIC-20 games cassettes

Virtual Wizard
Carnival
Gremlin
Star Wars

Cyberball
Mystery House
Thermal Imaging
Laserball

Claw Game of the Week
Rescue from Gamma 1
Maze
Nuclear

FOOTBALL WIZARD

For anyone that wants to play **REALISTIC** quality games. **Football Wizard** is the best game on the VIC-20. It's a real football game.



**QUALITY
GAMES**



Terminal Software, Inc.
P.O. Box 1000, San Jose, CA 95131
Tel: (415) 261-1000
Fax: (415) 261-1001
Address: 1000 N. 1st St.

64 and VIC 20 SPECIAL OFFERS

Commodore 64 computer NOW

£195.95

Plus our 1 year guarantee



64 STARTER PACK

Commodore 64
cassette deck Intro
to Basic (part 1)
Quickshot joystick
Game
ONLY £255.00

64 HOME/ BUSINESS PACK

Commodore 64
1541 disk drive
Box of diskettes +
FREE SOFTWARE
Easy Script and
compilation of 6
games on
disk **ONLY £395.00**

64 BUSINESS PACK

Commodore 64
1541 disk drive
MPS-801 Printer
Disks and Paper +
FREE SOFTWARE
Easy Script and
compilation of 6
games on
disk **ONLY £595.00**

C2N cassette deck **£39.10**
1541 disk drive + FREE Software **£195.95**
1701 colour monitor **£195.95**
Quickshot joystick **£9.50**
Pair of Quickshot joystick **£17.95**
Introduction to Basic (part 1) **£14.50**
Programmers Reference Guide **£9.95**

MPS-801 Printer **£195.95**
1524 Dot matrix printer **£295.95**
1520 printhead/plotter **£149.95**
RX800 Dot matrix printer **£259.95**
RX800/T Dot matrix printer **£299.95**
FX800 Dot matrix printer **£399.95**
FX100 Dot matrix printer **£345.95**

(UK) Daisy Wheel Printer £395.95

commodore VIC 20 SPECIAL OFFER PACKAGE



+ C2N cassette recorder + Introduction to
Basics Part 1 (Manual and 2 cassettes to take
you through the first steps in computing) + 1
cassette with four games + Only from
Chromasonic: **FREE DUST COVER** normally
sold for £3.95. If purchased separately these
items would cost £345.99

OUR PRICE £134.95

**PLUS OUR
1 YEAR
GUARANTEE**

16K RAM PACK £28.95 32K RAM PACK £47.95

ALL 64 PERIPHERALS, DISK DRIVES, PRINTERS, JOYSTICKS WORK WITH VIC20

MEDIA SUPPLIES

DISKETTES by Verbatim (supplied in boxes of 10)
Single sided, Double Density, 40 Tracks **£17.95**
Single sided, Quad Density, 80 Tracks **£24.75**
Double sided, Quad Density, 80 Tracks **£33.75**
Library Cases (Holds 151) **£1.25**

Plain Computer Paper
11x8 **£11.85**
11x9 **£13.45**
11x11 **£15.95**
Paper price is for 2000 sheets

Disk Covers
44/VIC20 **£3.95**
1341 **£1.95**
1525 **£2.95**
1526 **£3.95**

CHROMASONIC PERSONAL COMPUTERS

48 Junction Road, Archway, London N19 5SD

TEL: 01-263 9493 or 5

We guarantee all our products for 1 year. Scope 64 and
Vic which is 2 years. Payment may be made by Access,
Barclayscard, Bankers' draft, Building Society cheque or
cash. Sorry cheques need 4 days clearance. Postage and
packing. Prices allow £2 per computer, disk drive or
printer, this price also covers insurance.

ALL PRICES ARE INCLUSIVE OF VAT

Mishits and bull's eyes in the battle for games users

Pete Gerrard looks at the games available — and picks out some winners

LAST MONTH we looked long and hard at a selection of games software produced by Commodore for their own Am, 50 and C.BM 64 machines and found it to be a very mixed bag indeed. Now we're going to finish off the Commodore games then go on to review the opening shots in the software battle from other well-known companies including Atari and Qux Inc.

Money Wars is an unexpectedly game hiding behind an unimpressive title. Its cast, like so many others, has its roots in the merry-go-round of the Commodore Pet in a game with the obscure name of Hobbitaro.

More recently it has appeared for the Spectrum under the guise of Headbanger's Hijack, and now the Vic version follows the same old rules.

Here we sit control of a little man who runs along the bottom of the screen, dodges behind three invisible tape detectors. On the right of the screen is a bag of money, and it's your job to stay the man and get the money back to the left-hand side of the screen. At this point you go back for more money, and all the action gets just a little bit fiercer and a little bit more chaotic.

To make life more difficult for you, the barriers have opened up, and from the top of the screen comes a perpetual shower of little arrows. Makes a change from cars and dogs I suppose.

These arrows should they land on you, lightly instant death, so for the greater part of the game you're trying to dodge it and run from behind barriers while hiding from arrows. In your defence you can make your man run more quickly and you can also give him a shield to shelter under, but both of these can be valuable things again so should be used judiciously.

The cartridge game requires you to use the keyboard, which is good enough for the limited controls you have to play with. You are helped by two small blobs which float about at the top of the screen making up the arrows, but after about the third move, being like a game very ironic.

These arrows that are left attached and that don't hit the ground in you, each one one of your lives becomes and take a chunk out of it, and again it too long before your barriers begin to look very ragged indeed.

This game is certainly addictive, and manages to work new life into an old theme by adding one or two nice little extras. Well worth a look.

Comet

Comet Wars. What, you may wonder, is an comet? According to some ancient comet is a Comets word used to describe holiday makers, so this game about descending comets ought to go down well in the west country.

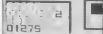
Whenever they see, they appear as a game that is essentially like Tank Attack, and most expert machine code programming gives you an extremely responsive controls aimed at you with the barons for the best score of obstacles.

These obstacles frequently hide behind jumble of rocks, and keep out in the last minute. But they appear to be fairly powerful, since they don't die as you, they just keep advancing down the screen. When one of them reaches the bottom of the screen the game is lost.

Recommended for players with nimble fingers, the arcade game is an easy one to get to grips with, but shouldn't hold the attention of the devoted arcade master.

The reason for this is that the screen lets the attacking waves graze down fairly like comets, like Comets before-masters, move slowly about, and never seem to get very near to the bottom of the screen. This makes the shooting of them very easy. Just manoeuvre your right one position and bang! Another one disappears.

Coming out of one wave of comets just brings on another lot, and so the game goes on. The comets don't appear to change their habits between levels, and they never get too close to the bottom of the screen. After 15 minutes of playing and waiting



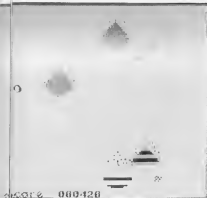
For Money Wars, a character gets it — but disappears at it



At it for a wave of comets — remnants of the game



Where's that car you chased the driver?



Commodore 64: Falcon Patrol

hundreds of it and the machine was crushed off.

Of course, Commodore isn't the only company producing software for the Commodore 64. There's others here secondly bought out new products, and the price for the same products publicly must go to Virgin Software, for Falcon Patrol.

Falcon Patrol: I don't care whether the author of a program like talking with Ford Escort and thinking real life in country parts, but Virgin insists that you know all about things, and in whole waiting for the tape to find you can read all about three lines and the contents and holders. But what is he like as a programmer?

Assumably good, in the opening screen there is a nice manual introduction leads you into the game, which starts with you in control of a VTOL jet, sole survivor of the Falcon patrol, whose job it is now to defend the car against the invading enemy rabbits.

To begin the game a nice graphical display shows the city at the bottom half of the screen, and a clear blue sky above. Your plane is just refueling and topping up with missiles, you take off, and with the color for the signs of enemy planes.

Fast disappears as an alarming note as you where through the horizon over an impressive scrolling landscape. You can collect a few of your money bonus, but this is a hazardous task as the enemy makes no bones about destroying you while you at them. Like a laser, instantly killing up with patrol.

In combat the movement of the planes is handled well, and the overall impression is that young Steve is a good programmer. The graphics and sound are handled nicely, and although you can only use a joystick to play the game, attempting to play it by using the keyboard would probably have been impossible.

In the first batch of software released by Virgin they were heavily criticised for the quality of many of the games, and the fact that few of them would have been released by any other software company.

They appear to be taking steps to correct this with Falcon Patrol, and if other games live up to the same standards, they could well become a leading company.

Involved

But optimism resulted as Virgin's other game for the Commodore 64, *Brainium*, appeared on the horizon. Oh well, back to the ridiculous.

This game was written by a 16 year old called Kevin Keenan, so the Virgin that short informed us, and young Kevin has obviously figured out how to generate your own characters on the Commodore 64, as most of the missing graphics feature home-generated characters.

The idea of the game is much more complicated than the game itself. You are made a date how that's what it still handling against the screen flow. You have to reach the central point by destroying all the bars that the CPU sends out at you. These vary from level to level, but all have to be hit twice before that'll do.

One more feature is a pause function which sends you onto the next level and game.

ONE OF THE fascinating aspects of people who buy microcomputers is that there is hardly the expense, let alone that they are having more than just a machine to play with, with so to learn something on. This is quite typical when you think of how much we spend on fuel, tobacco, alcohol, clothes and, yes, but if you do want to justify your purchase (even if only to your inner self), what is available in the software line to solve your concerns?

Of course, the immediate reaction is the database word processing systems package that handles under a variety of names and forms, and I must confess that to me this software has a certain appeal. But is it really of any value to the average person? And if so, which is the better package? Or, to be blunt, what do we look for and what can you buy?

In earlier times database of any value was purely for the pros, and my own experiences tended to alternate me as a casual user of software from bugs and frustrations that made the price too high. More recently the competition and the technical advances have tended to mean that we, the consumers, are better served and better able to obtain value for money. This brings me to a company selling itself *Database Software* which has produced a very nice collection of programs with the small size not in mind. My definition of small size is not a computer against physical appearance but more an experience of possible use and consequently price expectation.

In taking two

Dating is really Chris Ely and John Ayres, two entrepreneurs who decided that the Connecticut 44 looked an interesting machine with potential for database and the idea began to make sense. They were able to turn Dating in January 1983. They opened a bank account and have built from their first sale (\$10,000) and have built from there. Today they have a solid line of seven programs aimed at the first time user (which they call the first phase of their business) and are about to expand into the second phase.

The programs run on both the Vc 20 and the Commodore 64 (as well as the Spectrum and BBC micro) and are run and distributed. They all reside in memory at the moment the programs are the database which does limit the amount of records available. The second phase will be aimed at the more advanced user where disk drives will enable direct access to the disk thus increasing the range of information available and the potential for primary storage. What this means is and how it can if you were using the database for names and addresses from the existing phone books you to a suitable number (between 100 and 200 perhaps on the Vc) whereas that can be made permanent once you can store the whole lot on disk and call them up as needed.

Let's have a look at the actual software. The first program available was DPM, a fairly elaborate which has remained the mainstay of the company's range. One

Getting down to small business

Mike Grace takes a look at the business market and finds Dialog well established

excellent aspect of Dialog's service is the free updates which arrive from you have purchased a program. I bought DPM back in the dark ages of last year for me Vc and have enjoyed two free updates since for the \$4 which are excellent improvements on the original DPM Programs for the Vc will run on the 64.

DPM is user-definable — which means that you can decide for yourself how many fields you want and how long they need to be. For anyone not into database yet I will briefly explain that the main use can store exactly what you want because you can start by writing into one field in field a just a column on your records. Let's look at an example which is probably one of the most likely uses for DPM, an address book. If you wanted to set up fields for that you could follow the outline below:

Field 1 NAME
Field 2 ADDRESS
Field 3 TOWN
Field 4 COUNTY
Field 5 POSTCODE
Field 6 TELEPHONE

That the example contains six fields, but DPM has the capability of being able to add up to nine more should you want (eg stock numbers for a business, students for a school etc), software for a sample.

DPM will cater for names, fields (in a telephone or stock record) and you can perform simple calculations (addition, multiplication, etc) on them. Other use the fields are changes only (which can be numbers of years, but you won't be carrying out calculations). The maximum field length is 100-255 characters in most previous, which is far more than you'd be likely to need, but that gives the system great flexibility.

Having set up your fields you just enter the data in — all the examples above you would enter the names and addresses — and then save to disk or tape. Having done that

you can carry out such operations, handy for names and searches, search the data, delete records, print and records, etc. While you DPM apart from the other systems I've read so far is the most of use and the flexibility for the price (\$24 at present).

In the space available I will try and describe what I have found to be the real advantages at DPM in the next months or so I've been using it. First, it is very easy to install data, or if you make a mistake you don't have to keep going back and redoing the whole record just because of a silly spelling mistake. (Only enough with some systems I've tried you cannot start a record without erasing the lot.)

Secondly, if you decide to change the name of your file, you can do so easily. This is also very useful as I can often open an hour or so knowing as data only in database I've got no change the data — which means starting all over again.

Thirdly, the program is all in Basic and you can take a copy of the disk or tape in case of damage here — another plus. If your programming is up to you can alter the Basic to suit yourself, or Dialog will offer it for you for a sum of £10-£20, bringing tailoring of software for the individual into an extremely reasonable price bracket.

Fourthly, a report writer section allows you to list out information in a format that suits you, only recording as printing the you for what you have decided to print. I found this most useful as drawing up lists of names and items that I was collecting in on one time, then adjusting it to another list at a later date.

There are other examples I could quote, but space prevents me from telling more. I am impressed by the simplicity and ease of use of this program. While it is aimed for a businessman with 1,000 records or so for the average microcomputer user would just like an analogue to Contacts card list, or

ALBUMS C D S			
DISK 1	DISK 2	DISK 3	DISK 4
DISK 1	DISK 2	DISK 3	DISK 4
1. NAME	2. ADDRESS	3. TOWN	4. COUNTY
5. POSTCODE	6. TELEPHONE	7. NAME	8. ADDRESS
9. TOWN	10. COUNTY	11. POSTCODE	12. TELEPHONE
13. NAME	14. ADDRESS	15. TOWN	16. COUNTY
17. POSTCODE	18. TELEPHONE	19. NAME	20. ADDRESS
21. TOWN	22. COUNTY	23. POSTCODE	24. TELEPHONE
25. NAME	26. ADDRESS	27. TOWN	28. COUNTY
29. POSTCODE	30. TELEPHONE	31. NAME	32. ADDRESS
33. TOWN	34. COUNTY	35. POSTCODE	36. TELEPHONE
37. NAME	38. ADDRESS	39. TOWN	40. COUNTY
41. POSTCODE	42. TELEPHONE	43. NAME	44. ADDRESS
45. TOWN	46. COUNTY	47. POSTCODE	48. TELEPHONE
49. NAME	50. ADDRESS	51. TOWN	52. COUNTY
53. POSTCODE	54. TELEPHONE	55. NAME	56. ADDRESS
57. TOWN	58. COUNTY	59. POSTCODE	60. TELEPHONE
61. NAME	62. ADDRESS	63. TOWN	64. COUNTY
65. POSTCODE	66. TELEPHONE	67. NAME	68. ADDRESS
69. TOWN	70. COUNTY	71. POSTCODE	72. TELEPHONE
73. NAME	74. ADDRESS	75. TOWN	76. COUNTY
77. POSTCODE	78. TELEPHONE	79. NAME	80. ADDRESS
81. TOWN	82. COUNTY	83. POSTCODE	84. TELEPHONE
85. NAME	86. ADDRESS	87. TOWN	88. COUNTY
89. POSTCODE	90. TELEPHONE	91. NAME	92. ADDRESS
93. TOWN	94. COUNTY	95. POSTCODE	96. TELEPHONE
97. NAME	98. ADDRESS	99. TOWN	100. COUNTY

Listing — the database for only, and even my record are included

keep a record of his output of *Popular Computing Weekly*, the quote is almost — well, good, and most important, easy to use.

A subsidiary program called DFM Labels will allow you to print out mail-order labels from a DFM address list (think of those Christmas cards again, won't you), and cost an extra \$10. Can't be bad.

Another Dosing program is Journal (\$19.95) which is essentially a financial diary. On looking into how the program works updating is a key you need to load JOURNAL.IF* whereas the listing of the directory revealed that the program had been moved to "JOURNAL.V" and are associated with a little file and the program continues "I was 10 required". Besides of many services and display — but no, it's just a way of identifying what journal you want as the software has provision for you to keep several different diaries of the same date if you wish.

The instructions are adequate, and the layout is very nice. Once you get into a, entering and deleting data is pretty easy, but to be honest I question the necessity for having a complete diary at all, as it really is easier to write it all down in a book. Having said that, if you are involved in some of money then the addition and subtraction facilities are handy, as is a bill calculator, too. Overall, after all, that's what computers do so well.

Some people do find databases difficult to work out for themselves, but the trouble is one of those people used to be told and so Dosing has made two packages similar to DFM, but with already defined fields, and a rather nice graphics screen display so that you can imagine you are using a standard form or page in a book. This is really taking user frustration to the extreme, and of course you lose something as your fields have already been defined, but for the casual collector of information (such as a catalogue of articles in a collection of records) who doesn't really understand how to use the database this idea is perfect.

Similarity

Although the two packages are very similar, Catalog is, in my mind, the better. On LOADING you are presented with a screen showing which describes a box containing four headings and 16 sections for your appointment records. The single star on the disk is called "ALBUMS*", it is really a catalogue of LPs with the title, artist number and classification followed by a listing of the tracks on each. And it is the centre of the other program, Dosing, its only eight sections but has four lists, which you can name yourself. That is more restrictive for maintaining magazine indexes as you only have eight sections, but if no catalogue numbers are involved then it might be a better system for you.

The actual procedures involved in both are similar (although less total programming of course), both are reasonably priced (\$19.95 for Dosing and \$10.95 for Catalog) and are pretty versatile. In both there instructions for entry and moving around the program are included which

should make them use fairly easy after about 10-20 minutes (depending on previous experience).

Features that particularly appealed to me were that you could sort in any way (NAME, date, RETURN), move quickly past various sections (just keep pressing RETURN, enter data and headings), at any time and price + it was time to avoid repeatedly pressing RETURN. These are all features of software that has been tested so that little things have been corrected.

Of course, you can enter and delete data, amend it easily, sort and search, and all the usual things. One may think to the whenever you make a move that might wipe your data you are reminded that you can SAVE to tape or disk — helped for people like me who tend to have their minds on higher things at times and mindlessly press the wrong button again. PRINTING is also fairly versatile, allowing you to print out the whole file, or just selected records in any order you like. Also both have the facility to check and see how many bytes of memory are left, and will get into a "filing" your record up although there is a bit of a time delay as this work is resource hungry to keep you happy that the program hasn't crashed.

Conclusion

The work with the disk makes me think I fully agree that there are a whole lot of possible applications such as home recommendations, a creative notebook, travel guide and timetable. Whilst it is true these are possibly applications, I still think a good notebook may be quicker and easier for most of us. But here it's quite a big deal where this software is finally in the study on search and sort. For me, this is the real advantage of my computer. Taking starting entries from a journal, you must all have the frustration of searching through a pile of back again looking for one particular entry. Well, had you entered all those entries into something like Dosing here it would be a simple matter to call up the file and search for a keyword track or (B&B) — and then it would be on the screen.

However the problem is that it takes quite a lot of self discipline to keep entering all these articles week after week for even more to be done after six months and enter the list. And this, really, is the snag with the software — to make it work you do have to keep typing the tape. But if you can do this then these two packages are both good value.

As I mentioned earlier Dosing is planning a phase 2 which may well be available by the time you read this. For my money this is where the really exciting stuff comes in. I don't drive a car — so keep watching the advert to contact them about 18 Short-Circuit, London WC2E 9AT. The 100 are all a tape-only owner and thinking of expanding your computer a little then the exciting programs are an excellent introduction into the world of databases. But, as with all software — the best advice is for you to try it and decide for yourself whether you could use it.

But as the disk drive is a little far removed from the present state, you might as well stay where you are.

This is reminiscent of the great Challenge only without the grid. The little ship can move up the screen a little way, and has total mobility at left and right directions, but it is a bit slow when it comes to moving out the death destroying bullets.

The explosion when you die are satisfying, and the graphical display is a good thing of whizzing columns, only comes everywhere, and worth being a few hours for.

But, and it's a big but, the game is very tedious in terms of play only, the involved display of defined graphics has been limited to by other games, and one little alien moving about the screen looks like the background of everything else. One could almost be forgiven for looking more for the maze, and being lost in it.

Notes

Collating with an alien reveals that they are 11 bit creatures and light, so another life number in the aforementioned graphical proceedings.

I had reason of Purple Turtles being the result of some drug-induced games-writing sessions, but in reality it is a very good game for kids, and anyone who has the instructions from Quake's tell you it is young at heart.

To the tune of Moving About on the floor, the instructions are displayed on the screen before the action commences. You are told that you are going to make up the sport of turtle holding, as provided by the extremely nice purple turtles.

These turtles float happily about in the river, and it is your job to control a little tank, make him jump from left to right to right back, and get over the other side of the river where some amazing fish awaits you as a reward. You then have to get back again with the fish, and when you do ship it at the foot of a lake over on the new bank.

As cool as the first jumps up and down with delight, and you have to go back and get some more. Up above, the blue sky has a cheerful sun beaming down on you. The white and black clouds drift by, and from time to time a balloon will cross the sky.

Purple Turtles is a good chess game, and makes such a change from shooting aliens and saving the universe. There are many levels of play. The difficulty comes from judging when the turtles are going to stop at the top of the river, as which one you can stop next to them, and when they're going to float down to the bottom — which can really put you into the river, and die.

The only disappointment about this game was the graphical display of your tank, in the end of it, well, the only words have got to be — no one.

A thoroughly engaging game, and anyone who has got to have a game that is not a game, the change from playing alone to being with holding a a next one to make. The rest of game that makes the one above on many days.

Quake's move back into more.

◀ Familiar scenarios with *Quester Warrior*, a do-dash swordplay game including the traditional barbarian space where slaying someone's idea of what *Quester Warrior* ought to look like.

This joystick-only game gets off to a bad start when the screen initially displayed five pages of instructions. Five pages? One would have thought, and the first disappeared from view too fast to be read anyway.

All they tell you is to put them, just upstream: you are the questing warrior who stands alone against the sinister evilwings and mangled mutants in a doom city of a fallen giant head. The usual run of the mill stating that any game's player will be familiar with.

Using your specific sense to tap nothing of the blade's gain, you have to shoot at everything to get another attempt to save some failed evil from doom and destruction.

There is something vaguely reminiscent about this game, as you stand alone at the top of the screen, firing at the damaged bodies of almost nothing up at you from below.

When those X's appear I could be looking up the side of the screen refugees from another game? Was the one on the bottom of the screen on the run from Jeff Minter? Who can't anyone have original ideas anymore?

Yes, it's all too familiar again. The action is merely fun and furious, and clearing one band of alien nearby brings on another lot, and the inevitable happens and you die a poor death at the hands of the



On screen does it follow a 16-bit computer graphics? mangled mutants. Or was it a creature? Hard to tell really.

But disaster at the end of the game. Having been established as usual, the screen froze and the whole game was frozen on and off a few times. This is nothing it is, but the words kept on flashing. Pressing every key resulted in nothing happening, until I reached the main title, in which point pressing the space and reset got us out of the program and left a machine that would not respond to anything. The run, *Quester Warrior*, back to work looking!

Harper House is done again in the computer world who hasn't heard of House? House is a lovely little rigger who first appeared in a park on the Spectrum, picking the flowers and being chased by the park guards while eating their lunches when they dropped some food attempting to have House out of the park.

House has had a number of adventures on the Spectrum, and now the little chap has switched over to the Commodore lot, as a game to game from Melbourne House.

House is a little spirit, with eyes and legs

and a hollow body, who runs about the maze, that is the park, picking up all the flowers (and sort of Pardon stuff), avoiding the guards, and eating any food that should appear. The maze has one entrance and one exit, and happily you don't have to pick more flowers before going into the next of four different levels.

Obviously, the further you progress the harder it gets, and at one point House was being chased by four different guards. He mostly wandered and started again.

As well as the flowers, guards and food, there is a little hell hidden somewhere in the maze. Hiding the hell for eating it, which is what he appears to do, needs the guards not a piece, and makes life easier for a little while.

And in the game goes on. Go through the fourth level and it's back to the beginning again, with everything happening just a little bit faster. But that is not the end of it. One aspect feature of the game is the ability to design and save your tape for later and your own maze.

This is done very much on what is termed code made from the original screen maze before the game commences, and you can draw mazes, put flowers down, balls, enemies, and one and attack on a tunnel or two for good measure.

The game can be played in a virtual limitless number of different mazes, which will make it a lifetime satisfaction.

It is a great little game, and Harper House himself is to be put as much of home on the Commodore lot as he was on the Spectrum. What's the next one coming out? ■

cable software

URGENTLY REQUIRE

ORIGINAL, MACHINE CODE GAMES PROGRAMS
FOR THE

**Commodore 64
& VIC 20**

We have an international dealer & marketing network
which will ensure maximum sales potential for your
program.

Write in confidence to:

Software Development (Dealer)
Cable Software Limited
Cape House
52 Lambury Road
Luton, Beds. LU3 2PL
Luton 581433

or telephone:



Disk drive delights



NEA VIC 30 owners had to, although older ones were given the choice. Commodore 64 owners can do what they feel like, as long as they don't mess around with an irreplaceable source of money.

Whether you choose for youself, or hand the choice forced upon you, Master also is some a home computer, the software applications will sooner or later have to find some means of storing information.

With the popular Vic 20 in the Pack it is assumed that you're going to be using a cassette deck, since this particular one is included in the package. For a Vic 30 this is a fairly safe assumption to make, not only Commodore would predict that this computer is a candidate in the business machine of the year, rather A II volume sales, and a policy J 54, of available RAM, confirms to put the machine in the fairly business-friendly circle.

However, if you decide that you would like to use a disk drive, there are a number of options open to you, and here we will take a look at some of the most popular drives currently available.

For Commodore 64 owners the choice is there, you can buy a cassette deck at the fairly high price of \$49.98, although there are currently difficult to come by, presumably because all of Commodore's stock is being used up in the Vic 20 Starter Pack. On the other hand you can throw around the bank balance in the waste and get out and purchase a disk drive.

But first of all, who has a disk drive anyway? That is, unless the question, and disk drives are certainly not cheap. At present, Commodore's recommended drive for both the Vic 30 and Commodore

HARDWARE REVIEW

Pete Gerrard look at life in the fast lane

64, the DM, costs around \$279.99. There will be two different drives one per machine, and the original Vic drive was intended to work with both machines.

The DM, as we all now know, wouldn't work with the 64 when it first appeared, and a new one was rushed into being. In the meantime a few unscrupulous dealers managed to make a fast buck by charging owners with a large amount of money for installing a small amount of ROM chip in the original DM drive.

There are other drives available, including the rather Commodore sized of drives for the 64 series of computers. 7.4 megabytes can be yours for a cost of just \$7,499, although it is debatable whether anyone would spend 12 times the cost of the computer on a disk drive.

The advantage of disk drives should be obvious to anyone with the slightest interest in computing, and having spent a couple of hundred quid on buying a computer it would be assumed that you have at least a flick for about the business.

Computers are slow, and you store only a limited amount of information. For superior performance any sort of file handling, recovery or a virtual no so machine access is impossible, and only sequential access can be used. That is the difference between records and tapes, a record can play any track you want to simply by moving the slider to the track in question, whereas, a tape has to wind through the rest of the

long, before reaching the required one.

There are drawbacks to disks. Tapes are cheap, so cheap, in storage with a small disk access system will break. Even those little manufacturers' trials of dancing whether the play, but you will be depressed on the cassette disk, after the program has finished loading can be unattended by, only, variation and a pair of glasses.

Disks are much harder to copy, they also (and slightly) cost a lot more, but if you are intending to use your system for any kind of serious use, disks it has to be for what are the kinds of drive currently available.

The standardised 1541 is a 1090 single drive unit. You can get both sides of a disk if you are brave enough (it has been done) the only 1541-40 disks are some rare ones, without any problems, but most people recommend that you stick to using just one side of the disk. This drive has the advantage of attaching directly to the RS 232 end of the back of the 64 or 65, and having two cash ports on its own back. One connects up to the computer, and that is for further data, changing of disk drives or programs.

A word of warning though, Commodore states that you can happily insert chosen disk drives to your heart's content, and transfer programs quite easily from one drive to another provided that you change the device number on each drive beforehand. You can change the device number by using the following series of commands:

OPEN 15,14
PRINT "15,14"
C H R \$ 0 1 5 4 1 0 0
C H R \$ 0 1 5 4 1 0 0 + N D C H R \$ 0 1 5 4 1 0 0
C L O S E 1 5
where ND is the new device number. ▶



Commodore Computer Systems' (interior) surprise — independent test price.

4) You wish to get to a point after drive loading HD recall it gets too dark to drive another 8 pages.

That is all very well, but it doesn't always work. Two people that I know can guarantee to having done one of the 8728 chips at the 64 by attempting to link up two different 1541s following the recommended procedure.

If you don't happen to know a friendly dealer who'll take 4 parts of Commodore off you in exchange for a new chip replacing the old one, you're in a fair amount of misery. This includes not only the \$15.00 (or \$25.00 at whatever price your dealer cares to quote) cost of the chip, but also the fixed overhead charge that is included in work over the "lighted amount of time" regardless of whether the job takes one minute or 30.

Apert from this odd habit of manufacturing units, one and again, to lose the disk drive unit. They do so, but there do the jobs that they were designed to do. That is, provide a reasonable storage facility for an acceptable price.

But what if you want to store more than 170K? To do this will not only require having a more expensive disk drive, but it will also require buying an interface into the bus.

Communicating

To start with, interfaces first of all, there are a number of units currently available that allow you to add to Commodore with IEEE (the standard on all Commodore's other drive devices, Commodore's other).

For those of you with a desire to connect up to IEEE drives, the most expensive interface currently on the market is probably that available from Oxford Computer Systems (which lives in Hemmings Road, Woodstock, Oxfordshire, telephone 08941 112300) at a price of \$99.00. This has been recently reduced (to \$129.00) but even so it is still hovering on the price scale, it allows a Vic or a 64 to connect up to either IEEE or 2 1/2" drives.

Now you may be wondering why anyone would produce a unit that puts you in BSIDE speed, when the two computers already have one on board. Well, as the case is in many others, Commodore enters a world of its own when it comes to copying

its products. In fact Commodore's RS-232 choice, about as much reminiscent to the real thing as Data Discs does to Berlitz.

The Oxford drive is known as Interpod and plugs into the back of the computer driving a number of sockets that are Interpod itself. There are the aforementioned IEEE and RS-232 ports as well as a Commodore RS-232 port to allow you to connect to data-bus other Commodore peripherals.

No doubt when it is integrated to a sophisticated device, and as we in today's computer to the way it doesn't take any numbers from the computer, it allows you to talk to all these strange devices, and has a number of built-in commands all at once. However, it's improvement is due to that of a British Red team, once if anything can go wrong with it, it will. More often than not it simply LOOPS OR BUILDS from disk and you and it will require a reset or at least interrupted time as it had used the complete computer script before the computer will talk to anything again.

If sophistication is what you're after, then you'll be happy that there are less expensive options. For example Data for Good, Road Berlin Industrial Estate, Berlin, Liverpool, on (051) 942 7101 produces a cheaper interface for both Vic and 64, at \$79.95. This is purely an IEEE interface and is a plug into the controller slot of the Vic, as it is also does not go to the way of using commercial software so divided to use a running version of the setup rate or after before putting into any more.

Others are available — for example from Impero (Impero House, Second Way, Weybridge, Middlesex, on 04 908 0999) Microway (1420 Route 29, Suite New Jersey 07068, U.S.A. on (609) 258 470 (077) and Analogix (18 Crown Street, Reading, Berkshire, on 0734 58016). Between them you'll be able to get an interface for anything from a disk drive to a tape interface.

But back to disk drives. There are a wide range available from Commodore and, and an extremely small range available from everyone else. The only fact that hardly anyone in this country is supplying anything other than Commodore's own disk drive.

The Commodore 4040 is a double drive unit, with each drive giving you a capacity of 170K, single-sided. The cost of drive you can expect to pay for this unit varies enormously, but you won't get much cheaper out of about \$300 unless you're buying second-hand. I've seen one person offering a 4040 for £250.00 so it's worth looking around.

But there's always a but: this drive does not have the latest version of Commodore's Disk Operating System (known as DOS), since that's when the drive tried to do when it's looking for a disk. And writing on a volume record program with the 4040 is difficult to say the least.

The dual-drive 3091 should be ignored. This is a 3040 that has been chopped at half but unfortunately the price isn't either the same but, and a common, an expensive single disk drive. By the time you've bought the relevant interface (Dunn, or Oxford Computer Systems), you'll have paid out about twice the cost of your computer, so you might as well have bought the 4040 in the first place.

Big brother

Big brother to the 4040 is Commodore's 8091, another double drive system, but this one gives you around half a megabyte per disk. This has 100K of built-in 2 1/2" installed in it, and with a whole range of special disk commands to allow the user to easily create a random access system.

It will also let a lot more money of course, around £100.00, but for a significant amount of memory and random access, someone considering using a Vic or 64 in business, would do well to run the (second-hand) solution for a break-down 1000.

There is a bigger drive, namely the E150, a double-sided version of the above, but the price begins to run beyond the level of that even the most advanced programs (perhaps would consider) so would be well advised to stay clear of them.

Well, as we've already seen there aren't too many "independent" drive's about, although a number of companies are now beginning to develop the technology behind the three inch disk. All the more that I've already mentioned are the standard 5 1/4 and 4 quarter inch disk's from good companies, like ITS, Bartlett (on 08044 11444) are beginning to use the technology and disks. No one has yet produced one for a Commodore machine, but it can only be a question of time.

Benny Boppin, a man between a desk and a tape, and also closely connected with the matter to do the machine, has been successful but that industry is as yet unproven and their instability is very noticeable.

So if you're going to add a drive to your system, you might as well make it a Commodore one. They're not the future in the world, but they do work with Commodore's computers, and their prices are lower than what manufacturers' machines could do.

When microchips and memory flopper become available an option, as it is in your hand, but they do have the drive you know.

METABOLIC LLAMAS BATTLE AT THE EDGE OF TIME

Two llamas, one from the future and one from the past, are locked in a battle of attrition. The future llama is a mutant, having been exposed to a high level of radiation. The past llama is a normal llama, but it is also a mutant, having been exposed to a high level of radiation. The battle is a fierce one, with both llamas using their unique abilities to defeat the other. The future llama is faster and stronger, but the past llama is more cunning and has a better understanding of the terrain. The battle is a testament to the power of evolution and the ability of llamas to adapt to their environment.



LLAMA GENE

The llama gene is a complex of genes that control the llama's metabolism. It is a highly complex gene, with many different parts that control different aspects of the llama's metabolism. The llama gene is a highly complex gene, with many different parts that control different aspects of the llama's metabolism. The llama gene is a highly complex gene, with many different parts that control different aspects of the llama's metabolism.

MAYHEM

Mayhem is a chaotic and unpredictable event. It is a time when the normal rules of the world are thrown out of the window. Mayhem is a time when the normal rules of the world are thrown out of the window. Mayhem is a time when the normal rules of the world are thrown out of the window.

SHINE BOWEN

Shine Bowen is a young girl who is a mutant. She has a unique ability that allows her to control the elements. She is a powerful and brave girl, and she is determined to use her abilities to help the world.



MYSTERY OF THE MUTANT LLAMA

The mystery of the mutant llama is a complex one. It is a story of a llama that has been exposed to a high level of radiation and has become a mutant. The llama is a powerful and brave creature, and it is determined to use its abilities to help the world. The mystery of the mutant llama is a complex one, and it is a story that is full of adventure and excitement.

PERMISSION

Permission is a word that is used to give someone the right to do something. It is a word that is used to give someone the right to do something. Permission is a word that is used to give someone the right to do something.



Mutant Llama
ADVANCED Llama Technology

IN BARRY PLAZA
FALLT HALL, NEW YORK
10-200-100, FALLT HALL, NEW YORK

CONCLUSION

The conclusion of the story is a happy one. The mutant llama has been defeated, and the world is at peace. The mutant llama has been defeated, and the world is at peace. The mutant llama has been defeated, and the world is at peace.

All mutants will
be caught and
punished.



Llamas at speed the Minter way

Graham Cunningham talks to Jeff Minter — the man behind Grandrunner, mutant games and many others

YOU'VE SEEN THE Buns, and the results — now meet the man who built the prod, Llamasoft's Jeff Minter. The first computer for him came across was a Commodore machine, but it was a Pet that the 34, 28 or 32K bit which he's since become a master at.

Jeff studied computers at north-west college in 1983, teaching himself Buns as fast as five months. But he doesn't recall the time with much fondness. "We were taught a dead boring, dead low-level schools language called C++," he says. "We didn't get near a keyboard, the program all went away somewhere else and we got problems back. And we had to do silly things like follow a conversation that the figure 0 should be opened rather than the number zero. But hidden away in the back of the classroom was a Pet and Jeff generally got to tinker with it, moving on from Buns to machine code."

This was the time when Space Invaders was all the rage although Jeff had his eyes on something higher. He kept a Hanspeter that he came up to London to visit the arcade where he discovered Star Fire — "The first third person space game I'd seen, where you were actually seeing the ship." So he wrapped up his Buns, visited of Space Invaders and moved on to machine coding Star Fire using horizontal boards and standard monitor without assembly. In the time too Jeff had bought his first computer, a 256K after saving up for months.

Out of step

But his programming was advancing out of step with the modern career. College was being introduced from its computers but a student's allow him to take an A level course in the subject. As a result at university Jeff had to do nearly all his study at home, which he hated — "I finished up the maths and so I had to go. Next stop was Oxford Polytechnic, "for a more computer oriented course". Jeff also made another move "the first big upgrade". From the 256K to a 280K. Now the time was divided between jobs outside during the day and graphics

programming for Dr. Tronix at night.

Then came another change of direction. Jeff's night work which put him on at the pub, but "turned out to be one of the best things that ever happened to me". So 18 months ago in his spare time at "postgraduate Jeff" then means, Minter" — but then the 32K arrived. Jeff bought one of the first ever 32K and he's still using it now. The reason he chose the 32K was the fact that it was familiar with Commodore machines. They he wrote the first machine code game to come out under his own label, Andy Attack. From Llamasoft, with the South Australian musician team producing the Australian country style.

Animals

Cashish had been Jeff's favourite animal at school, and he's going to Egypt this year to see them in their natural habitat. But now he prefers Buns — "They're faster and usually more docile although I've also got a miniature imported at cheap and quick. Llamas have been used in traditional Persian carpets for more than 1,000 years. Plus they'll be appearing in a newly designed tale page for all the Llamasoft games in a mix of grey tiger and dark brown colours. As Jeff works he is surrounded by the same motif — on tape, cushions and on his jumper. Jeff was also delighted to read that one of the designers of the original Apple logo is back at Llamasoft. "Apple have not been forgotten though — on top of Jeff's monitor sits a four-foot high model of one, and other members of the South Australian animal family may appear in the future games."

Andy Attack itself is a series of Deluxes, revealing Jeff's love of the arcade. It was an delight at the Commodore show in summer 1983 caught the eye of an American company, Humate Entertainment Software, and later that the Buns have never looked back. Next up was Tronix — "the first of the growing games which have a variety of new."

Jeff admits that Andy Attack and Tronix both show their arcade roots but he insists,



Jeff Minter — one of the most creative minds in the

game industry. He's here to writing a good game. He will say the arcade wherever he is in London but he won't work out what makes a game good rather than just copying it. "It's like music — they listen to music but don't just repeat what they've heard." And amidst Jeff adds:

"Copying is boring. I've no interest in doing another Deluxer home. He thinks that it's a new idea that should be encouraged — so people people should call it copies." He's now too placed order to his custom copies of his games coded in other local companies and UK games manufacturing houses he originally wrote.

After Tronix came Adventure "where you shoot the alien as fast as you can" — followed in the program which has made Llamasoft a household name among Commodore game fans Grandrunner. Speed was never the answer. Jeff explains what he wanted: "to do something very, very fast for the unquenchable 32K." He thought



Jeff and Jeff Gade at the middle of the first of six Laser Zoner games. Jeff is sitting at the desk, Jeff Gade is standing next to him.

of the game first, he says. "I loved the idea of the film Blade Runner. I borrowed a book from Campus, rereading it around a quarter dozen, spent a week on the coding. 'Getting as much as I could out of it.' And then there was Gadehouse. The main character in the game by name is the Zapper, which he describes as "a very efficient gas weapon."

Jeff says Gadehouse "highly really says as I was writing it." He was not the only one who lived it. The people at Campus called him up at 4 o'clock in the morning to pick up their copy of the game. Gadehouse's name is printed on the bottom of the title page. Jeff says he's "always [told about it] and the one he chose as program text was Laser Zoner."

Jeff will leave this video game and be working on a follow-up now. Laser Zoner gives you control of two outer ships which you co-ordinate to destroy all who invade on the scene. Jeff Gade, due to be released early this year on the Vic, says you can make

and, — but controlling four ships, one on each side of the frame. If you move the left hand ship up, the one on the right goes down as well, moves the top ship to the right and the one at the bottom goes left. So if you fire when any ship is on the middle you destroy its partner. Jeff promises that Jeff Gade will be "so fast it will make Robotnik look like a walk in the woods."

Laser Zoner was the fifth game from the Commodore 64 stable, all on the Vic 20. The arrival of the 64 brought a continuation of Gadehouse, followed by Matrix (in kind of Gadehouse Part II) for both machines, and a continuation of Laser Zoner.

Even when they say a game from the Vic up the 64, Jeff promises to write from scratch. As he explains: "This means you can tailor the program to the particular machine's capabilities." So Laser Zoner on the Vic is written in memory mode rather than color, because this looks best on the Vic which has big pixels. — pretty thing the 20s which stuck up the 64s. But the 64

64 Laser Zoner uses more colors? "because the pixels are smaller."

In fact Jeff is "in love with the 64 — it's beautiful." The only advantage of the Vic is that it can use more sound than the 64. And the particular disadvantage is the Vic is small screen. Jeff agrees that the 64 on both machines is not too fast, but the 64 is great for machine coding and the interrupts are really good. And "all the things wrong on the Spectrum are right on the 64. It's got a good keyboard, two parallel ports and a different sound through the TV." But he does believe that "however stupid to put the disk on a screen that needs changing, it's so slow."

In fact Jeff is now showcasing a piece of Commodore software into his tapes which speeds loading. Called Turbo, this involves adding tapes to be loaded faster than disks. The only snag is that the frequency involved are so high that the best type of disk drives cannot be used. —



Jeff will model yours! — but one day there will be real flowers on the garden in 1979

However, this has got advantages. As Jeff points out, "It will certainly be software games."

The Laser Zorro convention was followed by Home Rover on the 64, with Jeff's attempt to check some of his own growing ever stranger. In Home Rover you have to move. It leaves while avoiding the owner of the money you're borrowed. The owner, date lives in a hotel. Jeff stayed in during a show, engaged the game. Almost immediately he and his father decided most of the show for the 64, finished in the end of his year.

It was back to the 64 and the Vic 20 for the next game. Microplanets: Lunar Blinks at the Edge of Time. As Jeff explains, "I usually go from a 64 game now to one on the Vic, and then back to the 64." So next up was Revenge of the Mutant Camels for the 64, finished in the end of his year.

As the game suggests this is a sequel to

Attack of the Mutant Camels, which came out between Godfather on the 64 and Mutant. There's 40 games in Revenge and each has to be played differently each time. Jeff thinks that the randomness is one of the features of his games. He says: "You could have a robot have to play games like Mine Mine on the Spectrum because each game plays the same once you've mastered it." Although he adds that Mutant Mine itself is "very well programmed".

Using Imagination

In Revenge you, as the camel, find time, find a range of adventures. Among the rest of success and distinctive weapons too men and women. Mutant Camels: nuclear weapons (the Camel is good news, being kamikaze boulders and nuclear weapons (think and yellow), nuclear goals ("I'm on holiday in Camel's, spontaneously exploding sheep, sheep pointing like as you and make that look

down on you, and much more). I'll do about a lot of practical details and the number of ways a human can tell and a number of ways. All in all, it's a game "where everything runs into something else".

Revenge will be followed by Hell Gate and then Jeff has his eye on a 3D space game for the 64. He promises that "the new games will be at least as good as the old ones, probably better". Looking further into the future, he's keen on the new generation of space machines, giving high scores and easy to handle machines — you'll be able to see each line on the screen's end.

An extension has already been built into Jeff's partner's house to handle his growing range of music, history of video games, and collections of Phrasal verbs. He raised them as often as move to the US.

Although the process certainly changed me" to the next step is a house of letters — and he says that then there will be flowers in the back garden. ■


```

0 REM
1 REM ALIEN ATTACK
2 REM
3 REM BY J.R. WILSON
4 REM
5 REM ON VIC20 +16K RAM
6 REM
7 POKE 36076,15
10 SC=250:PBEX(640)
20 CL=37680
30 IF SC<4896 THEN CL=33480
40 HS=0
50 HSB="VIC"
60 PUT XY(30),V(30)
100 G=0
110 SP=30
120 X=0
130 C=1
140 PRINT"##### L I E ##### TRACK"
150 PRINT"##### HIGH SCORE".HS
160 PRINT"##### VHS"
170 PRINT"##### INSTRUCTIONS ?"
180 GOTO 4
190 IF A="V" THEN 5000
200 IF A="H" THEN 100
200 G=0
510 PRINT"SCORE ".S
520 FOR I=0 TO 30
530 X(I)=INT(RND(1)*40)
540 Y(I)=INT(RND(1)*20)+22
550 NEXT
560 Y3=0
570 CO=0
1000 A=PBEX(200)
1005 CO=0
1010 IF A=32 THEN I=-1
1020 IF A=26 THEN I=1
1030 IF X=0 THEN I=0
1040 IF X=21 THEN I=-1
1050 POKE30+X+22,32
1060 X=X+I
1070 POKE30+X+22,30
1080 POKE CL+X+22,0
1090 IF A=15 AND Y3=0 THEN X=X+Y3=2
1090 C=C+1
1100 IF C=50 THEN 1140
1110 C=1
1120 IF V(30)=0 THEN SP=SP-1
1130 IF SP=5 THEN SP=0
1140 IF Y3=0 THEN 1200
1150 POKE30+X+Y3+22,32
1160 Y3=Y3+1
1165 IF Y3=23 THEN Y3=0 POKE36076,0 GOTO1200
1170 K=PBEX(CO+X+Y3+22)
1171 IF K=233 THEN Y3=Y3-1 X=X-1
1172 IF K=168 THEN 2000
1173 IF K=225 THEN Y3=Y3+1 X=X+1
1180 POKE30+X+Y3+22,46
1190 POKECL+X+Y3+22,6
1195 POKE36076,230+Y3+0
1198 IF CO=0 THEN CO=1 GOTO1140
1200 IF V(30)=0 THEN 1000
1210 IF RND(1)>.2 THEN 1000

```

Air war special on the Vic and the 64

STAR GAME

Alien Attack

Destroy the aliens
with John Wilson

ALIEN ATTACK is a screen program for the Commodore Vici computer which requires more than the normal 16 K RAM. The program will run on a Vic +16K RAM pack, but it should work with a lower memory expansion. Before I go into how the program works, I will give a brief description of how to play the game.

You take control of a spaceship at the top of the screen and shoot down any players against the moving aliens. The alien fleet will appear at the bottom of the screen and



will slowly move toward you. Your ship is armed with a single laser cannon that can be fired downwards by pressing the RETURN key. As your ship is slowed by, no-manure navigation, it will continue to move as the distance until it reaches the edge of the screen, or you change direction. This can be accomplished by pressing Z to move left, or N to right.

To destroy an enemy ship, you must hit it on the middle, otherwise your laser beam will bounce off the shielding, covering the rest of the ship. As the ship drops only three short-range weapons, they will only shoot when within range. Unfortunately, since there, the enemy vessels cannot be avoided, and your ship is destroyed. You gain points for destroying alien ships, but other score is reset to zero if you let any ships through to your planet. As the game continues, the alien ships move faster and faster until they reach an incredible speed, and it is no longer possible to avoid the fleet.

In order to play the game, you do not need to know how the program works, but for those who want to modify the program, I describe the main parts in detail. ▶

```

1200 WCD=OR(XOR(XOR(1)AND
1210 WCD=INT(ORND(1)*15)+22
1220 R=WCD*1023+50+WCD
1230 WCD=WCD-1
1240 IF WCD=2 THEN 3000
1250 IF WCD<15 AND WCD+1=00 THEN 4000
1260 IF WCD>20 THEN 1000
1270 POKR=32 POKR+1.32 POKR+2.32
1280 POKR+22.32 POKR+23.32 POKR+24.32
1290 R=R+22.32+50+WCD
1300 POKR=232 POKR+1.160 POKR+2.223
1310 POKR+22.285 POKR+23.182 POKR+24.80
1320 POKR=2 POKR+1.2 POKR+2.2
1330 POKR+22.2 POKR+23.2 POKR+24.2
1340 GOTO 1000
2000 S=S+5
2010 FL=0
2020 FOR I=1 TO 30
2030 IF W(I)+1=00 AND Y0=Y(I) THEN FL=1
2040 NEXT
2050 R=50+WCD+Y(YR)*1023
2060 POKR=6876.8
2070 POKR=77 POKR+1.66 POKR+2.70
2080 POKR+22.70 POKR+23.66 POKR+24.77
2090 FOR J=1 TO 2000 NEXT
2091 Y(FL)=0
2092 PRINT "SCORE ";S
2095 Y0=0
2100 POKR=32 POKR+1.32 POKR+2.32
2110 POKR+22.32 POKR+23.32 POKR+24.32
2120 GOTO 1000
3000 S=0
3010 PRINT "SCORE 0"
3020 POKR=32 POKR+1.32 POKR+2.32
3030 POKR+22.32 POKR+23.32 POKR+24.32
3040 W(I)=0
3050 GOTO 1000
4000 FOR J=WCD TO 1 STEP -1
4010 R=POKR/50+W*1023
4020 POKR=6876.250+100
4030 POKR/50+W*1023.90
4040 POKR/50+W*1023.90
4050 POKR/50+W*1023.90
4060 POKR/50+W*1023.90
4070 POKR/50+W*1023.90
4080 POKR/50+W*1023.90
4090 POKR/50+W*1023.90
4100 POKR/50+W*1023.90
4110 POKR/50+W*1023.90
4120 POKR/50+W*1023.90
4130 POKR/50+W*1023.90
4140 POKR/50+W*1023.90
4150 POKR/50+W*1023.90
4160 POKR/50+W*1023.90
4170 POKR/50+W*1023.90
4180 POKR/50+W*1023.90
4190 POKR/50+W*1023.90
4200 POKR/50+W*1023.90
4210 POKR/50+W*1023.90
4220 POKR/50+W*1023.90
4230 POKR/50+W*1023.90
4240 POKR/50+W*1023.90
4250 POKR/50+W*1023.90
4260 POKR/50+W*1023.90
4270 POKR/50+W*1023.90
4280 POKR/50+W*1023.90
4290 POKR/50+W*1023.90
4300 POKR/50+W*1023.90
4310 POKR/50+W*1023.90
4320 POKR/50+W*1023.90
4330 POKR/50+W*1023.90
4340 POKR/50+W*1023.90
4350 POKR/50+W*1023.90
4360 POKR/50+W*1023.90
4370 POKR/50+W*1023.90
4380 POKR/50+W*1023.90
4390 POKR/50+W*1023.90
4400 POKR/50+W*1023.90
4410 POKR/50+W*1023.90
4420 POKR/50+W*1023.90
4430 POKR/50+W*1023.90
4440 POKR/50+W*1023.90
4450 POKR/50+W*1023.90
4460 POKR/50+W*1023.90
4470 POKR/50+W*1023.90
4480 POKR/50+W*1023.90
4490 POKR/50+W*1023.90
4500 POKR/50+W*1023.90
4510 POKR/50+W*1023.90
4520 POKR/50+W*1023.90
4530 POKR/50+W*1023.90
4540 POKR/50+W*1023.90
4550 POKR/50+W*1023.90
4560 POKR/50+W*1023.90
4570 POKR/50+W*1023.90
4580 POKR/50+W*1023.90
4590 POKR/50+W*1023.90
4600 POKR/50+W*1023.90
4610 POKR/50+W*1023.90
4620 POKR/50+W*1023.90
4630 POKR/50+W*1023.90
4640 POKR/50+W*1023.90
4650 POKR/50+W*1023.90
4660 POKR/50+W*1023.90
4670 POKR/50+W*1023.90
4680 POKR/50+W*1023.90
4690 POKR/50+W*1023.90
4700 POKR/50+W*1023.90
4710 POKR/50+W*1023.90
4720 POKR/50+W*1023.90
4730 POKR/50+W*1023.90
4740 POKR/50+W*1023.90
4750 POKR/50+W*1023.90
4760 POKR/50+W*1023.90
4770 POKR/50+W*1023.90
4780 POKR/50+W*1023.90
4790 POKR/50+W*1023.90
4800 POKR/50+W*1023.90
4810 POKR/50+W*1023.90
4820 POKR/50+W*1023.90
4830 POKR/50+W*1023.90
4840 POKR/50+W*1023.90
4850 POKR/50+W*1023.90
4860 POKR/50+W*1023.90
4870 POKR/50+W*1023.90
4880 POKR/50+W*1023.90
4890 POKR/50+W*1023.90
4900 POKR/50+W*1023.90
4910 POKR/50+W*1023.90
4920 POKR/50+W*1023.90
4930 POKR/50+W*1023.90
4940 POKR/50+W*1023.90
4950 POKR/50+W*1023.90
4960 POKR/50+W*1023.90
4970 POKR/50+W*1023.90
4980 POKR/50+W*1023.90
4990 POKR/50+W*1023.90
5000 POKR/50+W*1023.90
5010 POKR/50+W*1023.90
5020 POKR/50+W*1023.90
5030 POKR/50+W*1023.90
5040 POKR/50+W*1023.90
5050 POKR/50+W*1023.90
5060 POKR/50+W*1023.90
5070 POKR/50+W*1023.90
5080 POKR/50+W*1023.90
5090 POKR/50+W*1023.90
5100 POKR/50+W*1023.90
5110 POKR/50+W*1023.90
5120 POKR/50+W*1023.90
5130 POKR/50+W*1023.90
5140 POKR/50+W*1023.90
5150 POKR/50+W*1023.90
5160 POKR/50+W*1023.90
5170 POKR/50+W*1023.90
5180 POKR/50+W*1023.90
5190 POKR/50+W*1023.90
5200 POKR/50+W*1023.90
5210 POKR/50+W*1023.90
5220 POKR/50+W*1023.90
5230 POKR/50+W*1023.90
5240 POKR/50+W*1023.90
5250 POKR/50+W*1023.90
5260 POKR/50+W*1023.90
5270 POKR/50+W*1023.90
5280 POKR/50+W*1023.90
5290 POKR/50+W*1023.90
5300 POKR/50+W*1023.90
5310 POKR/50+W*1023.90
5320 POKR/50+W*1023.90
5330 POKR/50+W*1023.90
5340 POKR/50+W*1023.90
5350 POKR/50+W*1023.90
5360 POKR/50+W*1023.90
5370 POKR/50+W*1023.90
5380 POKR/50+W*1023.90
5390 POKR/50+W*1023.90
5400 POKR/50+W*1023.90
5410 POKR/50+W*1023.90
5420 POKR/50+W*1023.90
5430 POKR/50+W*1023.90
5440 POKR/50+W*1023.90
5450 POKR/50+W*1023.90
5460 POKR/50+W*1023.90
5470 POKR/50+W*1023.90
5480 POKR/50+W*1023.90
5490 POKR/50+W*1023.90
5500 POKR/50+W*1023.90
5510 POKR/50+W*1023.90
5520 POKR/50+W*1023.90
5530 POKR/50+W*1023.90
5540 POKR/50+W*1023.90
5550 POKR/50+W*1023.90
5560 POKR/50+W*1023.90
5570 POKR/50+W*1023.90
5580 POKR/50+W*1023.90
5590 POKR/50+W*1023.90
5600 POKR/50+W*1023.90
5610 POKR/50+W*1023.90
5620 POKR/50+W*1023.90
5630 POKR/50+W*1023.90
5640 POKR/50+W*1023.90
5650 POKR/50+W*1023.90
5660 POKR/50+W*1023.90
5670 POKR/50+W*1023.90
5680 POKR/50+W*1023.90
5690 POKR/50+W*1023.90
5700 POKR/50+W*1023.90
5710 POKR/50+W*1023.90
5720 POKR/50+W*1023.90
5730 POKR/50+W*1023.90
5740 POKR/50+W*1023.90
5750 POKR/50+W*1023.90
5760 POKR/50+W*1023.90
5770 POKR/50+W*1023.90
5780 POKR/50+W*1023.90
5790 POKR/50+W*1023.90
5800 POKR/50+W*1023.90
5810 POKR/50+W*1023.90
5820 POKR/50+W*1023.90
5830 POKR/50+W*1023.90
5840 POKR/50+W*1023.90
5850 POKR/50+W*1023.90
5860 POKR/50+W*1023.90
5870 POKR/50+W*1023.90
5880 POKR/50+W*1023.90
5890 POKR/50+W*1023.90
5900 POKR/50+W*1023.90
5910 POKR/50+W*1023.90
5920 POKR/50+W*1023.90
5930 POKR/50+W*1023.90
5940 POKR/50+W*1023.90
5950 POKR/50+W*1023.90
5960 POKR/50+W*1023.90
5970 POKR/50+W*1023.90
5980 POKR/50+W*1023.90
5990 POKR/50+W*1023.90
6000 POKR/50+W*1023.90
6010 POKR/50+W*1023.90
6020 POKR/50+W*1023.90
6030 POKR/50+W*1023.90
6040 POKR/50+W*1023.90
6050 POKR/50+W*1023.90
6060 POKR/50+W*1023.90
6070 POKR/50+W*1023.90
6080 POKR/50+W*1023.90
6090 POKR/50+W*1023.90
6100 POKR/50+W*1023.90
6110 POKR/50+W*1023.90
6120 POKR/50+W*1023.90
6130 POKR/50+W*1023.90
6140 POKR/50+W*1023.90
6150 POKR/50+W*1023.90
6160 POKR/50+W*1023.90
6170 POKR/50+W*1023.90
6180 POKR/50+W*1023.90
6190 POKR/50+W*1023.90
6200 POKR/50+W*1023.90
6210 POKR/50+W*1023.90
6220 POKR/50+W*1023.90
6230 POKR/50+W*1023.90
6240 POKR/50+W*1023.90
6250 POKR/50+W*1023.90
6260 POKR/50+W*1023.90
6270 POKR/50+W*1023.90
6280 POKR/50+W*1023.90
6290 POKR/50+W*1023.90
6300 POKR/50+W*1023.90
6310 POKR/50+W*1023.90
6320 POKR/50+W*1023.90
6330 POKR/50+W*1023.90
6340 POKR/50+W*1023.90
6350 POKR/50+W*1023.90
6360 POKR/50+W*1023.90
6370 POKR/50+W*1023.90
6380 POKR/50+W*1023.90
6390 POKR/50+W*1023.90
6400 POKR/50+W*1023.90
6410 POKR/50+W*1023.90
6420 POKR/50+W*1023.90
6430 POKR/50+W*1023.90
6440 POKR/50+W*1023.90
6450 POKR/50+W*1023.90
6460 POKR/50+W*1023.90
6470 POKR/50+W*1023.90
6480 POKR/50+W*1023.90
6490 POKR/50+W*1023.90
6500 POKR/50+W*1023.90
6510 POKR/50+W*1023.90
6520 POKR/50+W*1023.90
6530 POKR/50+W*1023.90
6540 POKR/50+W*1023.90
6550 POKR/50+W*1023.90
6560 POKR/50+W*1023.90
6570 POKR/50+W*1023.90
6580 POKR/50+W*1023.90
6590 POKR/50+W*1023.90
6600 POKR/50+W*1023.90
6610 POKR/50+W*1023.90
6620 POKR/50+W*1023.90
6630 POKR/50+W*1023.90
6640 POKR/50+W*1023.90
6650 POKR/50+W*1023.90
6660 POKR/50+W*1023.90
6670 POKR/50+W*1023.90
6680 POKR/50+W*1023.90
6690 POKR/50+W*1023.90
6700 POKR/50+W*1023.90
6710 POKR/50+W*1023.90
6720 POKR/50+W*1023.90
6730 POKR/50+W*1023.90
6740 POKR/50+W*1023.90
6750 POKR/50+W*1023.90
6760 POKR/50+W*1023.90
6770 POKR/50+W*1023.90
6780 POKR/50+W*1023.90
6790 POKR/50+W*1023.90
6800 POKR/50+W*1023.90
6810 POKR/50+W*1023.90
6820 POKR/50+W*1023.90
6830 POKR/50+W*1023.90
6840 POKR/50+W*1023.90
6850 POKR/50+W*1023.90
6860 POKR/50+W*1023.90
6870 POKR/50+W*1023.90
6880 POKR/50+W*1023.90
6890 POKR/50+W*1023.90
6900 POKR/50+W*1023.90
6910 POKR/50+W*1023.90
6920 POKR/50+W*1023.90
6930 POKR/50+W*1023.90
6940 POKR/50+W*1023.90
6950 POKR/50+W*1023.90
6960 POKR/50+W*1023.90
6970 POKR/50+W*1023.90
6980 POKR/50+W*1023.90
6990 POKR/50+W*1023.90
7000 POKR/50+W*1023.90
7010 POKR/50+W*1023.90
7020 POKR/50+W*1023.90
7030 POKR/50+W*1023.90
7040 POKR/50+W*1023.90
7050 POKR/50+W*1023.90
7060 POKR/50+W*1023.90
7070 POKR/50+W*1023.90
7080 POKR/50+W*1023.90
7090 POKR/50+W*1023.90
7100 POKR/50+W*1023.90
7110 POKR/50+W*1023.90
7120 POKR/50+W*1023.90
7130 POKR/50+W*1023.90
7140 POKR/50+W*1023.90
7150 POKR/50+W*1023.90
7160 POKR/50+W*1023.90
7170 POKR/50+W*1023.90
7180 POKR/50+W*1023.90
7190 POKR/50+W*1023.90
7200 POKR/50+W*1023.90
7210 POKR/50+W*1023.90
7220 POKR/50+W*1023.90
7230 POKR/50+W*1023.90
7240 POKR/50+W*1023.90
7250 POKR/50+W*1023.90
7260 POKR/50+W*1023.90
7270 POKR/50+W*1023.90
7280 POKR/50+W*1023.90
7290 POKR/50+W*1023.90
7300 POKR/50+W*1023.90
7310 POKR/50+W*1023.90
7320 POKR/50+W*1023.90
7330 POKR/50+W*1023.90
7340 POKR/50+W*1023.90
7350 POKR/50+W*1023.90
7360 POKR/50+W*1023.90
7370 POKR/50+W*1023.90
7380 POKR/50+W*1023.90
7390 POKR/50+W*1023.90
7400 POKR/50+W*1023.90
7410 POKR/50+W*1023.90
7420 POKR/50+W*1023.90
7430 POKR/50+W*1023.90
7440 POKR/50+W*1023.90
7450 POKR/50+W*1023.90
7460 POKR/50+W*1023.90
7470 POKR/50+W*1023.90
7480 POKR/50+W*1023.90
7490 POKR/50+W*1023.90
7500 POKR/50+W*1023.90
7510 POKR/50+W*1023.90
7520 POKR/50+W*1023.90
7530 POKR/50+W*1023.90
7540 POKR/50+W*1023.90
7550 POKR/50+W*1023.90
7560 POKR/50+W*1023.90
7570 POKR/50+W*1023.90
7580 POKR/50+W*1023.90
7590 POKR/50+W*1023.90
7600 POKR/50+W*1023.90
7610 POKR/50+W*1023.90
7620 POKR/50+W*1023.90
7630 POKR/50+W*1023.90
7640 POKR/50+W*1023.90
7650 POKR/50+W*1023.90
7660 POKR/50+W*1023.90
7670 POKR/50+W*1023.90
7680 POKR/50+W*1023.90
7690 POKR/50+W*1023.90
7700 POKR/50+W*1023.90
7710 POKR/50+W*1023.90
7720 POKR/50+W*1023.90
7730 POKR/50+W*1023.90
7740 POKR/50+W*1023.90
7750 POKR/50+W*1023.90
7760 POKR/50+W*1023.90
7770 POKR/50+W*1023.90
7780 POKR/50+W*1023.90
7790 POKR/50+W*1023.90
7800 POKR/50+W*1023.90
7810 POKR/50+W*1023.90
7820 POKR/50+W*1023.90
7830 POKR/50+W*1023.90
7840 POKR/50+W*1023.90
7850 POKR/50+W*1023.90
7860 POKR/50+W*1023.90
7870 POKR/50+W*1023.90
7880 POKR/50+W*1023.90
7890 POKR/50+W*1023.90
7900 POKR/50+W*1023.90
7910 POKR/50+W*1023.90
7920 POKR/50+W*1023.90
7930 POKR/50+W*1023.90
7940 POKR/50+W*1023.90
7950 POKR/50+W*1023.90
7960 POKR/50+W*1023.90
7970 POKR/50+W*1023.90
7980 POKR/50+W*1023.90
7990 POKR/50+W*1023.90
8000 POKR/50+W*1023.90
8010 POKR/50+W*1023.90
8020 POKR/50+W*1023.90
8030 POKR/50+W*1023.90
8040 POKR/50+W*1023.90
8050 POKR/50+W*1023.90
8060 POKR/50+W*1023.90
8070 POKR/50+W*1023.90
8080 POKR/50+W*1023.90
8090 POKR/50+W*1023.90
8100 POKR/50+W*1023.90
8110 POKR/50+W*1023.90
8120 POKR/50+W*1023.90
8130 POKR/50+W*1023.90
8140 POKR/50+W*1023.90
8150 POKR/50+W*1023.90
8160 POKR/50+W*1023.90
8170 POKR/50+W*1023.90
8180 POKR/50+W*1023.90
8190 POKR/50+W*1023.90
8200 POKR/50+W*1023.90
8210 POKR/50+W*1023.90
8220 POKR/50+W*1023.90
8230 POKR/50+W*1023.90
8240 POKR/50+W*1023.90
8250 POKR/50+W*1023.90
8260 POKR/50+W*1023.90
8270 POKR/50+W*1023.90
8280 POKR/50+W*1023.90
8290 POKR/50+W*1023.90
8300 POKR/50+W*1023.90
8310 POKR/50+W*1023.90
8320 POKR/50+W*1023.90
8330 POKR/50+W*1023.90
8340 POKR/50+W*1023.90
8350 POKR/50+W*1023.90
8360 POKR/50+W*1023.90
8370 POKR/50+W*1023.90
8380 POKR/50+W*1023.90
8390 POKR/50+W*1023.90
8400 POKR/50+W*1023.90
8410 POKR/50+W*1023.90
8420 POKR/50+W*1023.90
8430 POKR/50+W*1023.90
8440 POKR/50+W*1023.90
8450 POKR/50+W*1023.90
8460 POKR/50+W*1023.90
8470 POKR/50+W*1023.90
8480 POKR/50+W*1023.90
8490 POKR/50+W*1023.90
8500 POKR/50+W*1023.90
8510 POKR/50+W*1023.90
8520 POKR/50+W*1023.90
8530 POKR/50+W*1023.90
8540 POKR/50+W*1023.90
8550 POKR/50+W*1023.90
8560 POKR/50+W*1023.90
8570 POKR/50+W*1023.90
8580 POKR/50+W*1023.90
8590 POKR/50+W*1023.90
8600 POKR/50+W*1023.90
8610 POKR/50+W*1023.90
8620 POKR/50+W*1023.90
8630 POKR/50+W*1023.90
8640 POKR/50+W*1023.90
8650 POKR/50+W*1023.90
8660 POKR/50+W*1023.90
8670 POKR/50+W*1023.90
8680 POKR/50+W*1023.90
8690 POKR/50+W*1023.90
8700 POKR/50+W*1023.90
8710 POKR/50+W*1023.90
8720 POKR/50+W*1023.90
8730 POKR/50+W*1023.90
8740 POKR/50+W*1023.90
8750 POKR/50+W*1023.90
8760 POKR/50+W*1023.90
8770 POKR/50+W*1023.90
8780 POKR/50+W*1023.90
8790 POKR/50+W*1023.90
8800 POKR/50+W*1023.90
8810 POKR/50+W*1023.90
8820 POKR/50+W*1023.90
8830 POKR/50+W*1023.90
8840 POKR/50+W*1023.90
8850 POKR/50+W*1023.90
8860 POKR/50+W*1023.90
8870 POKR/50+W*1023.90
8880 POKR/50+W*1023.90
8890 POKR/50+W*1023.90
8900 POKR/50+W*1023.90
8910 POKR/50+W*1023.90
8920 POKR/50+W*1023.90
8930 POKR/50+W*1023.90
8940 POKR/50+W*1023.90
8950 POKR/50+W*1023.90
8960 POKR/50+W*1023.90
8970 POKR/50+W*1023.90
8980 POKR/50+W*1023.90
8990 POKR/50+W*1023.90
9000 POKR/50+W*1023.90
9010 POKR/50+W*1023.90
9020 POKR/50+W*1023.90
9030 POKR/50+W*1023.90
9040 POKR/50+W*1023.90
9050 POKR/50+W*1023.90
9060 POKR/50+W*1023.90
9070 POKR/50+W*1023.90
9080 POKR/50+W*1023.90
9090 POKR/50+W*1023.90
9100 POKR/50+W*1023.90
9110 POKR/50+W*1023.90
9120 POKR/50+W*1023.90
9130 POKR/50+W*1023.90
9140 POKR/50+W*1023.90
9150 POKR/50+W*1023.90
9160 POKR/50+W*1023.90
9170 POKR/50+W*1023.90
9180 POKR/50+W*1023.90
9190 POKR/50+W*1023.90
9200 POKR/50+W*1023.90
9210 POKR/50+W*1023.90
9220 POKR/50+W*1023.90
9230 POKR/50+W*1023.90
9240 POKR/50+W*1023.90
9250 POKR/50+W*1023.90
9260 POKR/50+W*1023.90
9270 POKR/50+W*1023.90
9280 POKR/50+W*1023.90
9290 POKR/50+W*1023.90
9300 POKR/50+W*1023.90
9310 POKR/50+W*1023.90
9320 POKR/50+W*1023.90
9330 POKR/50+W*1023.90
9340 POKR/50+W*1023.90
9350 POKR/50+W*1023.90
9360 POKR/50+W*1023.90
9370 POKR/50+W*1023.90
9380 POKR/50+W*1023.90
9390 POKR/50+W*1023.90
9400 POKR/50+W*1023.90
9410 POKR/50+W*1023.90
9420 POKR/50+W*1023.90
9430 POKR/50+W*1023.90
9440 POKR/50+W*1023.90
9450 POKR/50+W*1023.90
9460 POKR/50+W*1023.90
9470 POKR/50+W*1023.90
9480 POKR/50+W*1023.90
9490 POKR/50+W*1023.90
9500 POKR/50+W*1023.90
9510 POKR/50+W*1023.90
9520 POKR/50+W*1023.90
9530 POKR/50+W*1023.90
9540 POKR/50+W*1023.90
9550 POKR/50+W*1023.90
9560 POKR/50+W*1023.90
9570 POKR/50+W*1023.90
9580 POKR/50+W*1023.90
9590 POKR/50+W*1023.90
9600 POKR/50+W*1023.90
9610 POKR/50+W*1023.90
```



```

0  REM *****+*****+*****+
1  REM #
2  REM # COPYRIGHT (C) 1983 R. COPE #
3  REM #
4  REM # PLANE IS A GAME FOR CSM 64 #
5  REM #
6  REM *****+*****+*****+
7  REM
8  REM NOT FOR USE WITH SIMONS BASIC I
9  REM
10 POKES3280,14 POKES3281,8
20 PRINT"1000 AIR- PLANE 64"
21 PRINT"
22 PRINT"BY R. COPE FOR THE CSM 64 COMPUTER"
23 PRINT"INSTRUCTIONS FOR PLAY FOLLOW"
24 PRINT"*****+*****+*****+ PRESS ANY KEY TO CONTINUE
25 IFPEEK(127)=64GOTO25
30 PRINT"1000 INSTRUCTIONS FOR PLAY"
40 PRINT"*****+*****+*****+ Y = LEFT B = RIGHT"
41 PRINT"*****+*****+*****+ REFACE = FIRE" PRINT"
42 PRINT"*****+*****+*****+ PRESS ANY KEY TO CONTINUE
43 IFPEEK(127)=64GOTO43
44 PRINT"07 POKES3280,10
45 GOTO2000
100 SP=2004
101 SC=56276
102 RC=55297
103 RP=1020
150 POKESP,1 POKESC,0
151 IFPEEK(197)=01THENSP=SP-1 SC=SC-1
152 IFPEEK(197)=20THENSP=SP+1 SC=SC+1
153 IFSP=1984THENSP=1984 SC=56296
154 IFSP=2020THENSP=2020 SC=56295
155 POKESP-1,62 POKESP+1,62
156 IFPEEK(197)=60THENSDS,19700
200 POKERP,0 POKERC,1
201 POKERP-1,62
301 RP=RP+1 RC=RC+1
400 IFRP=1984THENR00
500 GOTO100
600 POKES3272,01
601 PRINT"*****+*****+*****+ WELL SOME BUT YOU LOST YOUR BASE AFTER "
610 PRINT" A HARD BATTLE WITH THE AIR PLANE .... "
620 PRINT" YOU SCORED "5" POINTS"
630 FORI=0TO 2500 NEXT I:R00
700 POKESP,32 POKESC,7
710 POKESP+40,62 POKESC,7
720 SP=SP-40 SC=SC-40
730 IFPEEK(197)=01THENSC=SC+10 POKES3280,15 POKES3281,10
735 IFRP=1984THENGOTO700
750 POKESP+40,62 POKESP,62 RETURN
740 GOTO700
1000 PRINTPEEK(197)
1001 GOTO1000
2000 POKES3240 POKESC,40 CLP
2005 POKES3272,PEEK(53272)/40240+12
2010 FORI=10200TO12295 FORDA POKEL,A NEXT
2020 DATA 100,150,200,170,127,44,0
2030 FORI=12296TO12298+7 FORDA POKEL,A NEXT
2040 DATA24,24,36,30,165,255,30,65
2045 FORI=12704TO12704+7 FORDA POKEL,A NEXT
2046 DATA0,0,0,0,0,0,0,0
2047 FORI=12705TO12752+7 FORDA POKEL,A NEXT
2048 DATA0,0,24,24,24,24,0,24
2050 GOTO1000

```


Simple steps to sprite movement

Setting up sprites and then moving them around — Kevin Morgan explains how

THIS ARTICLE is aimed at describing a lot of the many ways of defining and handling sprites from your most basic programs. Included is a short program that sets up and moves sprites around the screen.

There are many sources of learning how to use the capabilities of your 64. The most

convenient is to find magazines such as this one, although magazines are of course limited by the amount of space available. If you wish to use sprites quickly and easily, and have no desire to know much about the way the 64 handles the information that one of the many, great editors currently available would be a good buy.

For those who do not have money to spare, even and wish to understand more about sprites, there are two books currently available which cover sprites adequately. One is *Using the 64* written by Peter Gossard and published by Dorland (£5.95). This is an excellent book and covers all aspects of the 64. The other book is *The Commodore Programmer's Reference Guide* which is available from Commodore. Both of these books are very useful in general and of particular help with sprites. The program included here will only cover some aspects of sprite use, but one of the two books mentioned will add the rest of the information.

The program included here sets four sprites moving up, two characters and moving them around the screen. The sprites are set up in two different ways to do so.

```
10 PRINT"COLORS (15) (30) (45) (60) (75) (90) (105) (120) (135) (150) (165) (180) (195) (210) (225) (240) (255) (270) (285) (300) (315) (330) (345) (360) (375) (390) (405) (420) (435) (450) (465) (480) (495) (510) (525) (540) (555) (570) (585) (600) (615) (630) (645) (660) (675) (690) (705) (720) (735) (750) (765) (780) (795) (810) (825) (840) (855) (870) (885) (900) (915) (930) (945) (960) (975) (990) (1005) (1020) (1035) (1050) (1065) (1080) (1095) (1110) (1125) (1140) (1155) (1170) (1185) (1200) (1215) (1230) (1245) (1260) (1275) (1290) (1305) (1320) (1335) (1350) (1365) (1380) (1395) (1410) (1425) (1440) (1455) (1470) (1485) (1500) (1515) (1530) (1545) (1560) (1575) (1590) (1605) (1620) (1635) (1650) (1665) (1680) (1695) (1710) (1725) (1740) (1755) (1770) (1785) (1800) (1815) (1830) (1845) (1860) (1875) (1890) (1905) (1920) (1935) (1950) (1965) (1980) (1995) (2010) (2025) (2040) (2055) (2070) (2085) (2100) (2115) (2130) (2145) (2160) (2175) (2190) (2205) (2220) (2235) (2250) (2265) (2280) (2295) (2310) (2325) (2340) (2355) (2370) (2385) (2400) (2415) (2430) (2445) (2460) (2475) (2490) (2505) (2520) (2535) (2550) (2565) (2580) (2595) (2610) (2625) (2640) (2655) (2670) (2685) (2700) (2715) (2730) (2745) (2760) (2775) (2790) (2805) (2820) (2835) (2850) (2865) (2880) (2895) (2910) (2925) (2940) (2955) (2970) (2985) (3000) (3015) (3030) (3045) (3060) (3075) (3090) (3105) (3120) (3135) (3150) (3165) (3180) (3195) (3210) (3225) (3240) (3255) (3270) (3285) (3300) (3315) (3330) (3345) (3360) (3375) (3390) (3405) (3420) (3435) (3450) (3465) (3480) (3495) (3510) (3525) (3540) (3555) (3570) (3585) (3600) (3615) (3630) (3645) (3660) (3675) (3690) (3705) (3720) (3735) (3750) (3765) (3780) (3795) (3810) (3825) (3840) (3855) (3870) (3885) (3900) (3915) (3930) (3945) (3960) (3975) (3990) (4005) (4020) (4035) (4050) (4065) (4080) (4095) (4110) (4125) (4140) (4155) (4170) (4185) (4200) (4215) (4230) (4245) (4260) (4275) (4290) (4305) (4320) (4335) (4350) (4365) (4380) (4395) (4410) (4425) (4440) (4455) (4470) (4485) (4500) (4515) (4530) (4545) (4560) (4575) (4590) (4605) (4620) (4635) (4650) (4665) (4680) (4695) (4710) (4725) (4740) (4755) (4770) (4785) (4800) (4815) (4830) (4845) (4860) (4875) (4890) (4905) (4920) (4935) (4950) (4965) (4980) (4995) (5010) (5025) (5040) (5055) (5070) (5085) (5100) (5115) (5130) (5145) (5160) (5175) (5190) (5205) (5220) (5235) (5250) (5265) (5280) (5295) (5310) (5325) (5340) (5355) (5370) (5385) (5400) (5415) (5430) (5445) (5460) (5475) (5490) (5505) (5520) (5535) (5550) (5565) (5580) (5595) (5610) (5625) (5640) (5655) (5670) (5685) (5700) (5715) (5730) (5745) (5760) (5775) (5790) (5805) (5820) (5835) (5850) (5865) (5880) (5895) (5910) (5925) (5940) (5955) (5970) (5985) (6000) (6015) (6030) (6045) (6060) (6075) (6090) (6105) (6120) (6135) (6150) (6165) (6180) (6195) (6210) (6225) (6240) (6255) (6270) (6285) (6300) (6315) (6330) (6345) (6360) (6375) (6390) (6405) (6420) (6435) (6450) (6465) (6480) (6495) (6510) (6525) (6540) (6555) (6570) (6585) (6600) (6615) (6630) (6645) (6660) (6675) (6690) (6705) (6720) (6735) (6750) (6765) (6780) (6795) (6810) (6825) (6840) (6855) (6870) (6885) (6900) (6915) (6930) (6945) (6960) (6975) (6990) (7005) (7020) (7035) (7050) (7065) (7080) (7095) (7110) (7125) (7140) (7155) (7170) (7185) (7200) (7215) (7230) (7245) (7260) (7275) (7290) (7305) (7320) (7335) (7350) (7365) (7380) (7395) (7410) (7425) (7440) (7455) (7470) (7485) (7500) (7515) (7530) (7545) (7560) (7575) (7590) (7605) (7620) (7635) (7650) (7665) (7680) (7695) (7710) (7725) (7740) (7755) (7770) (7785) (7800) (7815) (7830) (7845) (7860) (7875) (7890) (7905) (7920) (7935) (7950) (7965) (7980) (7995) (8010) (8025) (8040) (8055) (8070) (8085) (8100) (8115) (8130) (8145) (8160) (8175) (8190) (8205) (8220) (8235) (8250) (8265) (8280) (8295) (8310) (8325) (8340) (8355) (8370) (8385) (8400) (8415) (8430) (8445) (8460) (8475) (8490) (8505) (8520) (8535) (8550) (8565) (8580) (8595) (8610) (8625) (8640) (8655) (8670) (8685) (8700) (8715) (8730) (8745) (8760) (8775) (8790) (8805) (8820) (8835) (8850) (8865) (8880) (8895) (8910) (8925) (8940) (8955) (8970) (8985) (9000) (9015) (9030) (9045) (9060) (9075) (9090) (9105) (9120) (9135) (9150) (9165) (9180) (9195) (9210) (9225) (9240) (9255) (9270) (9285) (9300) (9315) (9330) (9345) (9360) (9375) (9390) (9405) (9420) (9435) (9450) (9465) (9480) (9495) (9510) (9525) (9540) (9555) (9570) (9585) (9600) (9615) (9630) (9645) (9660) (9675) (9690) (9705) (9720) (9735) (9750) (9765) (9780) (9795) (9810) (9825) (9840) (9855) (9870) (9885) (9900) (9915) (9930) (9945) (9960) (9975) (9990) (10005) (10020) (10035) (10050) (10065) (10080) (10095) (10110) (10125) (10140) (10155) (10170) (10185) (10200) (10215) (10230) (10245) (10260) (10275) (10290) (10305) (10320) (10335) (10350) (10365) (10380) (10395) (10410) (10425) (10440) (10455) (10470) (10485) (10500) (10515) (10530) (10545) (10560) (10575) (10590) (10605) (10620) (10635) (10650) (10665) (10680) (10695) (10710) (10725) (10740) (10755) (10770) (10785) (10800) (10815) (10830) (10845) (10860) (10875) (10890) (10905) (10920) (10935) (10950) (10965) (10980) (10995) (11010) (11025) (11040) (11055) (11070) (11085) (11100) (11115) (11130) (11145) (11160) (11175) (11190) (11205) (11220) (11235) (11250) (11265) (11280) (11295) (11310) (11325) (11340) (11355) (11370) (11385) (11400) (11415) (11430) (11445) (11460) (11475) (11490) (11505) (11520) (11535) (11550) (11565) (11580) (11595) (11610) (11625) (11640) (11655) (11670) (11685) (11700) (11715) (11730) (11745) (11760) (11775) (11790) (11805) (11820) (11835) (11850) (11865) (11880) (11895) (11910) (11925) (11940) (11955) (11970) (11985) (12000) (12015) (12030) (12045) (12060) (12075) (12090) (12105) (12120) (12135) (12150) (12165) (12180) (12195) (12210) (12225) (12240) (12255) (12270) (12285) (12300) (12315) (12330) (12345) (12360) (12375) (12390) (12405) (12420) (12435) (12450) (12465) (12480) (12495) (12510) (12525) (12540) (12555) (12570) (12585) (12600) (12615) (12630) (12645) (12660) (12675) (12690) (12705) (12720) (12735) (12750) (12765) (12780) (12795) (12810) (12825) (12840) (12855) (12870) (12885) (12900) (12915) (12930) (12945) (12960) (12975) (12990) (13005) (13020) (13035) (13050) (13065) (13080) (13095) (13110) (13125) (13140) (13155) (13170) (13185) (13200) (13215) (13230) (13245) (13260) (13275) (13290) (13305) (13320) (13335) (13350) (13365) (13380) (13395) (13410) (13425) (13440) (13455) (13470) (13485) (13500) (13515) (13530) (13545) (13560) (13575) (13590) (13605) (13620) (13635) (13650) (13665) (13680) (13695) (13710) (13725) (13740) (13755) (13770) (13785) (13800) (13815) (13830) (13845) (13860) (13875) (13890) (13905) (13920) (13935) (13950) (13965) (13980) (13995) (14010) (14025) (14040) (14055) (14070) (14085) (14100) (14115) (14130) (14145) (14160) (14175) (14190) (14205) (14220) (14235) (14250) (14265) (14280) (14295) (14310) (14325) (14340) (14355) (14370) (14385) (14400) (14415) (14430) (14445) (14460) (14475) (14490) (14505) (14520) (14535) (14550) (14565) (14580) (14595) (14610) (14625) (14640) (14655) (14670) (14685) (14700) (14715) (14730) (14745) (14760) (14775) (14790) (14805) (14820) (14835) (14850) (14865) (14880) (14895) (14910) (14925) (14940) (14955) (14970) (14985) (15000) (15015) (15030) (15045) (15060) (15075) (15090) (15105) (15120) (15135) (15150) (15165) (15180) (15195) (15210) (15225) (15240) (15255) (15270) (15285) (15300) (15315) (15330) (15345) (15360) (15375) (15390) (15405) (15420) (15435) (15450) (15465) (15480) (15495) (15510) (15525) (15540) (15555) (15570) (15585) (15600) (15615) (15630) (15645) (15660) (15675) (15690) (15705) (15720) (15735) (15750) (15765) (15780) (15795) (15810) (15825) (15840) (15855) (15870) (15885) (15900) (15915) (15930) (15945) (15960) (15975) (15990) (16005) (16020) (16035) (16050) (16065) (16080) (16095) (16110) (16125) (16140) (16155) (16170) (16185) (16200) (16215) (16230) (16245) (16260) (16275) (16290) (16305) (16320) (16335) (16350) (16365) (16380) (16395) (16410) (16425) (16440) (16455) (16470) (16485) (16500) (16515) (16530) (16545) (16560) (16575) (16590) (16605) (16620) (16635) (16650) (16665) (16680) (16695) (16710) (16725) (16740) (16755) (16770) (16785) (16800) (16815) (16830) (16845) (16860) (16875) (16890) (16905) (16920) (16935) (16950) (16965) (16980) (16995) (17010) (17025) (17040) (17055) (17070) (17085) (17100) (17115) (17130) (17145) (17160) (17175) (17190) (17205) (17220) (17235) (17250) (17265) (17280) (17295) (17310) (17325) (17340) (17355) (17370) (17385) (17400) (17415) (17430) (17445) (17460) (17475) (17490) (17505) (17520) (17535) (17550) (17565) (17580) (17595) (17610) (17625) (17640) (17655) (17670) (17685) (17700) (17715) (17730) (17745) (17760) (17775) (17790) (17805) (17820) (17835) (17850) (17865) (17880) (17895) (17910) (17925) (17940) (17955) (17970) (17985) (18000) (18015) (18030) (18045) (18060) (18075) (18090) (18105) (18120) (18135) (18150) (18165) (18180) (18195) (18210) (18225) (18240) (18255) (18270) (18285) (18300) (18315) (18330) (18345) (18360) (18375) (18390) (18405) (18420) (18435) (18450) (18465) (18480) (18495) (18510) (18525) (18540) (18555) (18570) (18585) (18600) (18615) (18630) (18645) (18660) (18675) (18690) (18705) (18720) (18735) (18750) (18765) (18780) (18795) (18810) (18825) (18840) (18855) (18870) (18885) (18900) (18915) (18930) (18945) (18960) (18975) (18990) (19005) (19020) (19035) (19050) (19065) (19080) (19095) (19110) (19125) (19140) (19155) (19170) (19185) (19200) (19215) (19230) (19245) (19260) (19275) (19290) (19305) (19320) (19335) (19350) (19365) (19380) (19395) (19410) (19425) (19440) (19455) (19470) (19485) (19500) (19515) (19530) (19545) (19560) (19575) (19590) (19605) (19620) (19635) (19650) (19665) (19680) (19695) (19710) (19725) (19740) (19755) (19770) (19785) (19800) (19815) (19830) (19845) (19860) (19875) (19890) (19905) (19920) (19935) (19950) (19965) (19980) (19995) (20010) (20025) (20040) (20055) (20070) (20085) (20100) (20115) (20130) (20145) (20160) (20175) (20190) (20205) (20220) (20235) (20250) (20265) (20280) (20295) (20310) (20325) (20340) (20355) (20370) (20385) (20400) (20415) (20430) (20445) (20460) (20475) (20490) (20505) (20520) (20535) (20550) (20565) (20580) (20595) (20610) (20625) (20640) (20655) (20670) (20685) (20700) (20715) (20730) (20745) (20760) (20775) (20790) (20805) (20820) (20835) (20850) (20865) (20880) (20895) (20910) (20925) (20940) (20955) (20970) (20985) (21000) (21015) (21030) (21045) (21060) (21075) (21090) (21105) (21120) (21135) (21150) (21165) (21180) (21195) (21210) (21225) (21240) (21255) (21270) (21285) (21300) (21315) (21330) (21345) (21360) (21375) (21390) (21405) (21420) (21435) (21450) (21465) (21480) (21495) (21510) (21525) (21540) (21555) (21570) (21585) (21600) (21615) (21630) (21645) (21660) (21675) (21690) (21705) (21720) (21735) (21750) (21765) (21780) (21795) (21810) (21825) (21840) (21855) (21870) (21885) (21900) (21915) (21930) (21945) (21960) (21975) (21990) (22005) (22020) (22035) (22050) (22065) (22080) (22095) (22110) (22125) (22140) (22155) (22170) (22185) (22200) (22215) (22230) (22245) (22260) (22275) (22290) (22305) (22320) (22335) (22350) (22365) (22380) (22395) (22410) (22425) (22440) (22455) (22470) (22485) (22500) (22515) (22530) (22545) (22560) (22575) (22590) (22605) (22620) (22635) (22650) (22665) (22680) (22695) (22710) (22725) (22740) (22755) (22770) (22785) (22800) (22815) (22830) (22845) (22860) (22875) (22890) (22905) (22920) (22935) (22950) (22965) (22980) (22995) (23010) (23025) (23040) (23055) (23070) (23085) (23100) (23115) (23130) (23145) (23160) (23175) (23190) (23205) (23220) (23235) (23250) (23265) (23280) (23295) (23310) (23325) (23340) (23355) (23370) (23385) (23400) (23415) (23430) (23445) (23460) (23475) (23490) (23505) (23520) (23535) (23550) (23565) (23580) (23595) (23610) (23625) (23640) (23655) (23670) (23685) (23700) (23715) (23730) (23745) (23760) (23775) (23790) (23805) (23820) (23835) (23850) (23865) (23880) (23895) (23910) (23925) (23940) (23955) (23970) (23985) (24000) (24015) (24030) (24045) (24060) (24075) (24090) (24105) (24120) (24135) (24150) (24165) (24180) (24195) (24210) (24225) (24240) (24255) (24270) (24285) (24300) (24315) (24330) (24345) (24360) (24375) (24390) (24405) (24420) (24435) (24450) (24465) (24480) (24495) (24510) (24525) (24540) (24555) (24570) (24585) (24600) (24615) (24630) (24645) (24660) (24675) (24690) (24705) (24720) (24735) (24750) (24765) (24780) (24795) (24810) (24825) (24840) (24855) (24870) (24885) (24900) (24915) (24930) (24945) (24960) (24975) (24990) (25005) (25020) (25035) (25050) (25065) (25080) (25095) (25110) (25125) (25140) (25155) (25170) (25185) (25200) (25215) (25230) (25245) (25260) (25275) (25290) (25305) (25320) (25335) (25350) (25365) (25380) (25395) (25410) (25425) (25440) (25455) (25470) (25485) (25500) (25515) (25530) (25545) (25560) (25575) (25590) (25605) (25620) (25635) (25650) (25665) (25680) (25695) (25710) (25725) (25740) (25755) (25770) (25785) (25800) (25815) (25830) (25845) (25860) (25875) (25890) (25905) (25920) (25935) (25950) (25965) (25980) (25995) (26010) (26025) (26040) (26055) (26070) (26085) (26100) (26115) (26130) (26145) (26160) (26175) (26190) (26205) (26220) (26235) (26250) (26265) (26280) (26295) (26310) (26325) (26340) (26355) (26370) (26385) (26400) (26415) (26430) (26445) (26460) (26475) (26490) (26505) (26520) (26535) (26550) (26565) (26580) (26595) (26610) (26625) (26640) (26655) (26670) (26685) (26700) (26715) (26730) (26745) (2676
```




Mastercode Assembler

for the Commodore 64

Full Commodore 64 Assembler/Disassembler



£14.95

Mastercode is a substantial and complex program of use to anyone interested in writing machine code on the Commodore 64. Its features include:

Machinecode monitor
File Editor
Disassembler
Assembler

Mastercode is a full two pass assembler. It accepts labels, variables and equations within assembly language programs. It is possible to store programs anywhere in memory, even in parts occupied by the Assembler. Programs can be saved to either tape or disc.

The Machine Code Monitor includes:

- WATCH OF MEMORY TO SCROLLABLE FRONT ■ BRIGHT BINARY MENU ■ EXECUTION OF MACHINE CODE PROGRAMS ■ CHANGING OF UNINITIALISED MEMORY TO INITIALISED POSC
- LOADING OF MACHINE CODE FILE FROM TAPE OR DISC ■ ONE BY STEP TRACING OF THE EXECUTION OF A MACHINE CODE PROGRAM INCLUDING DISPLAY OF REGISTER CONTENTS

The Disassembler will translate into assembly language the contents of any area of memory whether the 64s ROM or a user program. Output may be sent either to the screen or a printer.

The File Editor includes:

- ENTRY OF NUMBERED LINES OF ASSEMBLY LANGUAGE INSTRUCTIONS ■ LISTING INDIVIDUALLY OR IN BLOCKS OF PREVIOUSLY ENTERED LINES ■ EDITING INDIVIDUALLY OR IN BLOCKS OF EXISTING LINES ■ RE-NUMBERING OF EXISTING LINES ■ ENTERING 16-BYTE BINARY LANGUAGE FILES TO TAPE OR DISC ■ LOADING OF ASSEMBLY LANGUAGE FILES FROM TAPE OR DISC ■ LOCATION OF A BLOCK OF MEMORY SPECIFIED BY THE USER TO THE USER ASSEMBLY PROGRAM

The Assembler allows the translation of assembly language programs into machine code with full error checking, labelling and a range of assembler directives.

LOOK OUT FOR THE SUNSHINE RANGE IN WH. SMITH'S, BOOTS, JOHN MANNING'S, OTHER LEADING RETAIL CHAINS AND THROUGH OUR NATIONAL NETWORK OF BOOK SHOPS AND SPECIALIST STORES

Request details to: **SUNSHINE**, c/o M220 Software Assemblers
Box 1, Park Road, 1400, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 2681, 2682, 2683, 2684, 2685, 2686, 2687, 2688, 2689, 2690, 2691, 2692, 2693, 2694, 2695, 2696, 2697, 2698, 2699, 2700, 2701, 2702, 2703, 2704, 2705, 2706, 2707, 2708, 2709, 2710, 2711, 2712, 2713, 2714, 2715, 2716, 2717, 2718, 2719, 2720, 2721, 2722, 2723, 2724, 2725, 2726, 2727, 2728, 2729, 2730, 2731, 2732, 2733, 2734, 2735, 2736, 2737, 2738, 2739, 2740, 2741, 2742, 2743, 2744, 2745, 2746, 2747, 2748, 2749, 2750, 2751, 2752, 2753, 2754, 2755, 2756, 2757, 2758, 2759, 2760, 2761, 2762, 2763, 2764, 2765, 2766, 2767, 2768, 2769, 2770, 2771, 2772, 2773, 2774, 2775, 2776, 2777, 2778, 2779, 2780, 2781, 2782, 2783, 2784, 2785, 2786, 2787, 2788, 2789, 2790, 2791, 2792, 2793, 2794, 2795, 2796, 2797, 2798, 2799, 2800, 2801, 2802, 2803, 2804, 2805, 2806, 2807, 2808, 2809, 2810, 2811, 2812, 2813, 2814, 2815, 2816, 2817, 2818, 2819, 2820, 2821, 2822, 2823, 2824, 2825, 2826, 2827, 2828, 2829, 2830, 2831, 2832, 2833, 2834, 2835, 2836, 2837, 2838, 2839, 2840, 2841, 2842, 2843, 2844, 2845, 2846, 2847, 2848, 2849, 2850, 2851, 2852, 2853, 2854, 2855, 2856, 2857, 2858, 2859, 2860, 2861, 2862, 2863, 2864, 2865, 2866, 2867, 2868, 2869, 2870, 2871, 2872, 2873, 2874, 2875, 2876, 2877, 2878, 2879, 2880, 2881, 2882, 2883, 2884, 2885, 2886, 2887, 2888, 2889, 2890, 2891, 2892, 2893, 2894, 2895, 2896, 2897, 2898, 2899, 2900, 2901, 2902, 2903, 2904, 2905, 2906, 2907, 2908, 2909, 2910, 2911, 2912, 2913, 2914, 2915, 2916, 2917, 2918, 2919, 2920, 2921, 2922, 2923, 2924, 2925, 2926, 2927, 2928, 2929, 2930, 2931, 2932, 2933, 2934, 2935, 2936, 2937, 2938, 2939, 2940, 2941, 2942, 2943, 2944, 2945, 2946, 2947, 2948, 2949, 2950, 2951, 2952, 2953, 2954, 2955, 2956, 2957, 2958, 2959, 2960, 2961, 2962, 2963, 2964, 2965, 2966, 2967, 2968, 2969, 2970, 2971, 2972, 2973, 2974, 2975, 2976, 2977, 2978, 2979, 2980, 2981, 2982, 2983, 2984, 2985, 2986, 2987, 2988, 2989, 2990, 2991, 2992, 2993, 2994, 2995, 2996, 2997, 2998, 2999, 3000, 3001, 3002, 3003, 3004, 3005, 3006, 3007, 3008, 3009, 3010, 3011, 3012, 3013, 3014, 3015, 3016, 3017, 3018, 3019, 3020, 3021, 3022, 3023, 3024, 3025, 3026, 3027, 3028, 3029, 3030, 3031, 3032, 3033, 3034, 3035, 3036, 3037, 3038, 3039, 3040, 3041, 3042, 3043, 3044, 3045, 3046, 3047, 3048, 3049, 3050, 3051, 3052, 3053, 3054, 3055, 3056, 3057, 3058, 3059, 3060, 3061, 3062, 3063, 3064, 3065, 3066, 3067, 3068, 3069, 3070, 3071, 3072, 3073, 3074, 3075, 3076, 3077, 3078, 3079, 3080, 3081, 3082, 3083, 3084, 3085, 3086, 3087, 3088, 3089, 3090, 3091, 3092, 3093, 3094, 3095, 3096, 3097, 3098, 3099, 3100, 3101, 3102, 3103, 3104, 3105, 3106, 3107, 3108, 3109, 3110, 3111, 3112, 3113, 3114, 3115, 3116, 3117, 3118, 3119, 3120, 3121, 3122, 3123, 3124, 3125, 3126, 3127, 3128, 3129, 3130, 3131, 3132, 3133, 3134, 3135, 3136, 3137, 3138, 3139, 3140, 3141, 3142, 3143, 3144, 3145, 3146, 3147, 3148, 3149, 3150, 3151, 3152, 3153, 3154, 3155, 3156, 3157, 3158, 3159, 3160, 3161, 3162, 3163, 3164, 3165, 3166, 3167, 3168, 3169, 3170, 3171, 3172, 3173, 3174, 3175, 3176, 3177, 3178, 3179, 3180, 3181, 3182, 3183, 3184, 3185, 3186, 3187, 3188, 3189, 3190, 3191, 3192, 3193, 3194, 3195, 3196, 3197, 3198, 3199, 3200, 3201, 3202, 3203, 3204, 3205, 3206, 3207, 3208, 3209, 3210, 3211, 3212, 3213, 3214, 3215, 3216, 3217, 3218, 3219, 3220, 3221, 3222, 3223, 3224, 3225, 3226, 3227, 3228, 3229, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3265, 3266, 3267, 3268, 3269, 3270, 3271, 3272, 3273, 3274, 3275, 3276, 3277, 3278, 3279, 3280, 3281, 3282, 3283, 3284, 3285, 3286, 3287, 3288, 3289, 3290, 3291, 3292, 3293, 3294, 3295, 3296, 3297, 3298, 3299, 3300, 3301, 3302, 3303, 3304, 3305, 3306, 3307, 3308, 3309, 3310, 3311, 3312, 3313, 3314, 3315, 3316, 3317, 3318, 3319, 3320, 3321, 3322, 3323, 3324, 3325, 3326, 3327, 3328, 3329, 3330, 3331, 3332, 3333, 3334, 3335, 3336, 3337, 3338, 3339, 3340, 3341, 3342, 3343, 3344, 3345, 3346, 3347, 3348, 3349, 3350, 3351, 3352, 3353, 3354, 3355, 3356, 3357, 3358, 3359, 3360, 3361, 3362, 3363, 3364, 3365, 3366, 3367, 3368, 3369, 3370, 3371, 3372, 3373, 3374, 3375, 3376, 3377, 3378, 3379, 3380, 3381, 3382, 3383, 3384, 3385, 3386, 3387, 3388, 3389, 3390, 3391, 3392, 3393, 3394, 3395, 3396, 3397, 3398, 3399, 3400, 3401, 3402, 3403, 3404, 3405, 3406, 3407, 3408, 3409, 3410, 3411, 3412, 3413, 3414, 3415, 3416, 3417, 3418, 3419, 3420, 3421, 3422, 3423, 3424, 3425, 3426, 3427, 3428, 3429, 3430, 3431, 3432, 3433, 3434, 3435, 3436, 3437, 3438, 3439, 3440, 3441, 3442, 3443, 3444, 3445, 3446, 3447, 3448, 3449, 3450, 3451, 3452, 3453, 3454, 3455, 3456, 3457, 3458, 3459, 3460, 3461, 3462, 3463, 3464, 3465, 3466, 3467, 3468, 3469, 3470, 3471, 3472, 3473, 3474, 3475, 3476, 3477, 3478, 3479, 3480, 3481, 3482, 3483, 3484, 3485, 3486, 3487, 3488, 3489, 3490, 3491, 3492, 3493, 3494, 3495, 3496, 3497, 3498, 3499, 3500, 3501, 3502, 3503, 3504, 3505, 3506, 3507, 3508, 3509, 3510, 3511, 3512, 3513, 3514, 3515, 3516, 3517, 3518, 3519, 3520, 3521, 3522, 3523, 3524, 3525, 3526, 3527, 3528, 3529, 3530, 3531, 3532, 3533, 3534, 3535, 3536, 3537, 3538, 3539, 3540, 3541, 3542, 3543, 3544, 3545, 3546, 3547, 3548, 3549, 3550, 3551, 3552, 3553, 3554, 3555, 3556, 3557, 3558, 3559, 3560, 3561, 3562, 3563, 3564, 3565, 3566, 3567, 3568, 3569, 3570, 3571, 3572, 3573, 3574, 3575, 3576, 3577, 3578, 3579, 3580, 3581, 3582, 3583, 3584, 3585, 3586, 3587, 3588, 3589, 3590, 3591, 3592, 3593, 3594, 3595, 3596, 3597, 3598, 3599, 3600, 3601, 3602, 3603, 3604, 3605, 3606, 3607, 3608, 3609, 3610, 3611, 3612, 3613, 3614, 3615, 3616, 3617, 3618, 3619, 3620, 3621, 3622, 3623, 3624, 3625, 3626, 3627, 3628, 3629, 3630, 3631, 3632, 3633, 3634, 3635, 3636, 3637, 3638, 3639, 3640, 3641, 3642, 3643, 3644, 3645, 3646, 3647, 3648, 3649, 3650, 3651, 3652, 3653, 3654, 3655, 3656, 3657, 3658, 3659, 3660, 3661, 3662, 3663, 3664, 3665, 3666, 3667, 3668, 3669, 3670, 3671, 3672, 3673, 3674, 3675, 3676, 3677, 3678, 3679, 3680, 3681, 3682, 3683, 3684, 3685, 3686, 3687, 3688, 3689, 3690, 3691, 3692, 3693, 3694, 3695, 3696, 3697, 3698, 3699, 3700, 3701, 3702, 3703, 3704, 3705, 3706, 3707, 3708, 3709, 3710, 3711, 3712, 3713, 3714, 3715, 3716, 3717, 3718, 3719, 3720, 3721, 3722, 3723, 3724, 3725, 3726, 3727, 3728, 3729, 3730, 3731, 3732, 3733, 3734, 3735, 3736, 3737, 3738, 3739, 3740, 3741, 3742, 3743, 3744, 3745, 3746, 3747, 3748, 3749, 3750, 3751, 3752, 3753, 3754, 3755, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3764, 3765, 3766, 3767, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3779, 3780, 3781, 3782, 3783, 3784, 3785, 3786, 3787, 3788, 3789, 3790, 3791, 3792, 3793, 3794, 3795, 3796, 3797, 3798, 3799, 3800, 3801, 3802, 3803, 3804, 3805, 3806, 3807, 3808, 3809, 3810, 3811, 3812, 3813, 3814, 3815, 3816, 3817, 3818, 3819, 3820, 3821, 3822, 3823, 3824, 3825, 3826, 3827, 3828, 3829, 3830, 3831, 3832, 3833, 3834, 3835, 3836, 3837, 3838, 3839, 3840, 3841, 3842, 3843, 3844, 3845, 3846, 3847, 3848, 3849, 3850, 3851, 3852, 3853, 3854, 3855, 3856, 3857, 3858, 3859, 3860, 3861, 3862, 3863, 3864, 3865, 3866, 3867, 3868, 3869, 3870, 3871, 3872, 3873, 3874, 3875, 3876,

Two's complement: turning positive numbers to negative

'Two's complement' may sound like a misheard cliché but it is in fact an important mathematical concept used for integers on the Vic, as Boris Allen explains

IF THE TIME is a clockwise clock, then the hours ago-the time was zero o'clock. In ordinary arithmetic, $3 \times 9 = 27$.

The world, and most of its machines, follow clock arithmetic. To turn through an angle of 360 degrees is to turn to the direction 90 degrees from one's original direction, 360 days from now is tomorrow a date that is different year, unless there is a leap year. On a car's odometer, one mile on from 99999 is 00000 (as 100000 is too large to fit on the dial).

Only a machine

A computer is only a machine, and a computer can only represent itself. The basic element on the Vic 20 (and it can only represent it) is a byte. A byte takes values from 0 to 255, and for example $255 + 1 = 0$ and $2 \times 255 = 0$. A byte would, to clock arithmetic, be a hour of 256, as there are 256 different numbers from 0 to 255.

On the Vic we can display the contents of bytes by the `PRINT` command, and if we `PRINT PEEK(N)`

where *N* is the number of a location (in addition to memory), then we print out the value of the number stored in location *N*. The command to put a value into a location is `POKE`, and

`POKE N, H`

will enter the value of *H* into the location *N*. Trying different values for *N* reveals that it is not possible to `PRINT` values of *N* less than 0 or more than 255 (though this is possible on some other computers). As a byte contains eight bits, we can investigate the characteristics of a byte by 'simulating' that it is 'copying' the behaviour of an eight bit byte.

Eight bits form a binary number, where the bits are numbered from right to left. The rightmost bit is normally known as bit 0, and the leftmost bit is usually known as bit 7. Each bit has a different weight to the formation of the value from that binary number.

Bit	Weight
0	1
1	2

2	4
3	8
4	16
5	32
6	64
7	128

For example, 1000010 is a binary number equivalent to $128 + 64 + 0 + 0 + 0 + 0 + 2 = 194$ as a decimal (or denary) number. or 194. As can easily be found, when all the bits are equal to one the denary value is 255.

Enter the program published with this article. Run the program, and in the request for the input number, enter 194. The program's response is to print the value 194 and 1000010 and — as the binary equivalent of the denary 194 is 1000010 — we obviously have a program to convert denary numbers into binary equivalents.

The operation of the program is fairly simple: the denary number is input and stored in variable *N*. The number *N* is then copied into variable *M*, variable *A* is set to zero, and variable *L* is set to one. Variable *A* is going to contain the representations of the binary number (bits 0 to 7) and variable *L* will give the position of the digit.

Looping

We go through the loop eight times, and the first test is to find out whether the number is odd or even. If the number is odd then there is a bit equal to one in the rightmost position, and if the number is even the rightmost bit is zero. Function `PEEK(N)` gives the result 1 if the number is odd, and the result 0 if the number is even. `PRINT`, therefore gives the value of the right most bit.

Support us and going through the loop for the first time, the variable *L* is equal to the value of the rightmost bit, the variable *A* has the value zero, and *T* has the value one. The assignment to *A* by `A = A + PEEK`, gives *A* the value of 1.

T is now made 16 times larger, and the value of the variable *L* is halved by `PRINT(N)`, with no remainder (as a result of the `INT` operation in `PRINT(N)`). Half of the

binary number 1100 is 100, and half of 10000 is 1000, so by halving the number (and ignoring the remainder) we have produced a new binary number moved along one position.

At the next activation of the loop, we find it the new binary number is zero as odd (as of the new rightmost bit zero or one's). We store that (as value at *A*), by adding 8**T* to *A*. *T* is now 16 times greater than before, and thus the bit value appears in the next digit along in the binary number *A*.

The binary appearing value which appears at the end of the program is, in fact, the ordinary denary number which we provided as a binary number. When we have evaluated eight bits moved, even though the number may be greater than 255.

Far down

Here are a succession of values to try

1
254
255
256
256
2555

to which the results for the first three are not that surprising. The fourth value (as 256) is surprising, as no eight bit binary number is 00000000 or 0. The number 1000 is an eight bit binary number, is 10000000.

In the second byte arithmetic of eight bits,

$255 + 1 = 256$, (that is binary number) and, as we all know, in ordinary arithmetic to produce zero you have to write

$$1 + 1 = 0$$

Does this mean that $1 + 1$ (at the same as 256, for eight bit binary numbers)? Try 1, and you see that it is 10000001, and as you remember 254 (as an eight bit binary number) is 00111111. Try 2 and the result is 00111110. Amazing!

The between bit for 0 and 2 is equal to one, and this is commonly known as the 'sign' bit in the spread forms of arithmetic. The special form of arithmetic is called 'two's complement' arithmetic, and is

3D COMPUTERS

THE HOME COMPUTER
SPECIALISTS

Early Booking at all
branches

With more branches than any other Commodore
Home Computer specialist dealer we offer



ONE STOP SHOPPING
FOR ALL YOUR

commodore

Call in at your local branch for friendly advice and
service

See a complete display of hardware and software
to build up your micro system

SOFTWARE

All the best sellers from
the top U.K. and U.S.A.
software houses, eg

LLANUSOFT
DATASOFT
EPYX
INFOCOM
RABBIT
INTERCEPTOR
SUPERSOFT
ONLINE
ABRASSO

PERIPHERALS

DISCS
PRINTERS
JOYSTICKS
MONITORS, RGB/
COLOUR
LIGHTPENS

LARGE RANGE OF BOOKS
JOURNALS, CATALOGUES &
PROMOTORY MATERIALS
ALWAYS IN
STOCK

TOLWORTH
230 Tolworth Road South
Tolworth, Surbiton
Surrey KT5 9HJ
Tel: 01 337 4317

SETON
20 Seton Road
Rimington, Barton
Surrey GU8 5AB
Tel: 01 842 2534

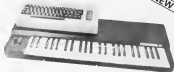
SAUND
114 Gainsborough Avenue
Edgware, London NW9 4AB
Tel: 01 852 5495

ROCKMANESWORTH
Gainsford Works
The Green, Crayke Green
Rockmanesworth
Herts. MK23 3AJ
Tel: 04623 719330

MILTON KEYNES
Unit 1, Beaufield
Stacey Musters
Milton Keynes MK12 6BP
Tel: 0525 313333

LUTON
1 Manor Road
Caddisden, Luton
Bed. LU1 4JG
Tel: 0582 54575

**NOW
HEAR
THIS!!**



At last a superb, professional-standard music system that's designed by musicians for
musicians.

MICROSOUND 64 is a full size, 4 octave music keyboard engineered to make the fullest use
of the COMMODORE 64's legendary sound capabilities for amateur and professional alike.
MICROSOUND 64's amazing facilities add a new dimension to your music and include —

- *Two user definable for real-time control.
- *Full sound storage and recall for playback or overdubbing — a
composer's dream.
- *Exciting add-on potential for a sensational range of complex musical
effects and state-of-the-art techniques, including digital sampling.
- *On-screen displays and graphic presentations.
- *Price £345 (inc. VAT) plus £3 post and packing.

MICROSOUND 64
The Key to Sound Technology

Enquiries to:
Autographics Ltd., 3a Reading Road,
Hurdley-on-Thames, Oxon RG5 1AR
Telephone: 0491 575485


```

0 REM PROGRAM 1
10 FNH(Y) = INT(Y/2)
20 FND(Y) = Y - 2*FNH(Y)
100 INPUT V
110 N = V
120 A = 0
130 T = 1
200 FOR I=1 TO 8
210 B = FND(N)
220 A = A + B*1
230 T = T*10
240 N = FNH(N)
250 NEXT I
300 PRINT
310 PRINT V, A
320 GOTO 100
READY.

```

Run this program and, in the response for the input number, enter 127.

► To add the integers on the Vtc, the reason why two's complement arithmetic is so important becomes clear when you realize that computers can only store positive values. When we perform calculations we need both positive and negative numbers, and so we have to find some way of treating certain positive numbers as if they were really negative numbers.

The 6002 processor, which the Vtc uses, has a special "flag" flag, which is set by software to be 1 in the accumulator and through up all computers use two's complement arithmetic, mode 0.

Values

For example, work out what a positive number becomes a negative number. 127 is an eight bit binary number in hex, at 01111111, though note that on the Vtc the first zero is missing. The binary number 128 is 00000001 and does have a sign bit set to one, so 128 more can be 128, but the same negative number gives a 255 in 11. If you enter 128 then you find that it is 00000000.

Place integers on the Vtc, take values, between 32768 and 32767. Integers are stored in two bytes and an 8 character hex number. 32768 is 8000000000000 and the binary number 32767 is 0111111111111111. Integers on the Vtc are stored according to the two complement arithmetic.

Adding

Two's complement also explains about the INT function, zero.

PRINT INT(3), INT(4) is 3 and the results are 3 and 4. The INT function always rounds down in value, and not towards zero. Here try

```
PRINT INT(1/3), INT(1/3)
so which the results are -1 and 0. The explanation of the later two examples all other INTs.
```

As an eight bit binary number the binary number 0 is equal to 00000000 and to decide to say we "lose" all the bits to the right (but). To keep it as an eight bit number, we add in an extra zero on the left, we produce 00000000 (as in the next statement about).

The binary number 1 is one, a positive complement number of eight bits, 01111111. To decide by two we have to subtract one bit, and then the answer will be seven bit number. To make the number up to eight bits, we have to add another zero on the left. As the number is negative, we have to keep the sign bit correct, and we get 11111111 in the left. This gives 11111111, which is the two's complement of 1.

Now try to
PRINT 1+3, 3+4, NOT(1)
and you will find 1+3 and 3+4 just with the last first. As a binary number, 3 is 00000010 and 3 is 01111101. If the first two binary numbers are compared, it can be seen that they are not equal, where there is a 1 in the first there is a 0 in the value of 0 in the other, and vice versa.

Flipping

The NOT function acts at the level of bits, and flips each bit from one and vice versa. That is why NOT(1) is 1, and NOT(32767) is 32768.

If something is "not" such as 1+3, then the Vtc gives you 1. The binary equivalent of 1 is 01111111 — that is, all bits are one. When all bits are "false" then the number is 00000000 or — in decimal — 0.

There is another way of storing positive and negative numbers. Known as "one's complement" arithmetic. In this form of arithmetic, a negative number is again indicated by the sign (but being one, but the rest of the number differs from the two's complement version).

If the positive value of the number X has the binary value 00001111, then the binary equivalent of X is 01110000. The one's complement here is produced by taking the positive number, and flipping the value of every bit. This is exactly the operation performed when we find NOT(X).

To form a two's complement number we add in more places than the two in the number have to be flipped, and not added to the result. In other words to form a two's complement number, we first produce a one's complement (and then add one to the two's complement form).

Try this

```
PRINT NOT(1) + 1, 1 + NOT(1)
in which the answers are -1 and 0. The function NOT does not expect the following value to be in parentheses, and it finds the one's complement of (1) + 1 (which is, of course, -5). The second zero in the print list is first used to find the two's complement version 1. The value 1 is added to the one's complement formed 1 (which is -4) to produce the two's complement result of 3.
```

The Vtc then checks on what is possible to perform with two's complement integers. The error

```
10 = 32768 + 1
is to produce an "ILLEGAL QUANTITY ERROR". In our eight byte arithmetic, 32768 + 1 = 128, and if we add these values into two's complement arithmetic, 127 + 1 = 128. There need to be a whole series of checks on addable values, so that errors such as 32768 + 1 = 32768 do not occur. ■
```


PRODUCTS FROM

Oxford Computer Systems (Software) Ltd.

SPEED UP ANY BASIC PROGRAM WITH OUR COMPILERS

Up to 10 times speed increase, reduced program size.

BASIC COMPILERS

Portapad Compiler for 4000/8000 series..... £128.00

Integer Basic Compiler for 3000/4000/5000 series £75.00

CROSS-COMPILERS FOR BASIC

Portapad Compiler source for 8000 series to run on 4000/8000..... £120.00

8-44 Integer compiler striping on 8000 series
program module installable on COM 64..... £125.00

8-Perb Compiler source on 8000 series to run on
700/9-128 series..... £450.00

X1000 Integer compiler compiling on 8000 series
program module code installable on 700/9-128..... £400.00

GIVE YOUR VIC OR 64 FULL IEEE AND RS232

Not a cartridge. Compatible with any software.

Interpod: Pre-standing Interface (using 8255A85
and 8255C) compatible to COM64/VC20..... £99.00

SPECIAL OFFER

Order 5-cartridge Interpod before Sat November 1983 and get
a free Portapad!

All prices are exclusive of VAT. There is also a mail-order price
pool and packing. Dealer discounts are available on all products
except the 700 cross-compiler.

Computers are supplied ex-stock, Interpod supplied 7 days
ex stock.

COMMODORE SOFTWARE

Native compilers for the COM 64 and the 700/9-128 are
available only from Commodore.

Oxford Computer Systems (Software) Ltd.
1 Grosvenor Road, Broadstock, Bournemouth B14 4RQ
Telephone: 0204 911290 Telex: 831147 Ref GCSL

VISA accepted

BYTEWELL

64 SOFTWARE

Kong	7.95	The Hobbit	14.95
3D Time Trek	7.95	Hungry Horace	5.95
But Attack	7.95	3 Deep Space	7.95
Brands	7.95	Purple Turtles	7.95
Grandmaster chess	17.95	Quintic Warrior	7.95
Egbert	7.50	Falcon Patrol	6.95
The Fabulous Wanda	7.95	Robin to the Rescue	7.95
Star Trek	7.00	Radar Rat Race Cartridge	9.99
Panic	7.00	Everest Ascent	6.50
Seven City	7.00	Ship of the Line	6.50
Defenda	7.00	Vultures	7.00
Arcadia	5.50	Galaxiom	9.00

AND LOTS MORE
SEND SAE FOR FULL LIST

Please make cheques/POs payable to
BYTEWELL.

Overseas Orders please include S/P & P
Bytewell, 283 Court Road, Barry,
S Glamorgan CF6 7EW Telephone
(0446) 742491


```

1400 C000 - NO LESS THAN START OF WORD, SO
1405 C005 - ONLY REQUIRED TO CHECK LG-BYTES
1410 C010 - IF LG-BYTES ARE EQUAL
1415 C015 :
1420 C020 CHECK LG PRINCP+1
1425 C025 C030 C035 C040 C045 C050
1430 C060 :
1435 C065 : CHECK LG-BYTES
1440 C070 :
1445 C075 :
1450 C080 : LG PRINCP
1455 C085 C090 C095 C100 C105 C110
1415 C015 :
1420 C020 : OR, THERE ARE VARIABLES TO TEST.
1425 C025 :
1430 C030 : LG PRINCP
1435 C035 :
1440 C040 : PREPARE TO TEST THIS VARIABLE FOR
1445 C045 : IDENTITY - IS IT AN INTEREST ?
1450 C050 :
1455 C055 : LG PRINCP+1
1460 C060 : LG PRINCP+1
1465 C065 : LG PRINCP+1
1470 C070 :
1475 C075 : IT MUST BE AN INTEREST - SKIP TO
1480 C080 : NEXT VARIABLE OF 7 LOCALS.
1485 C085 :
1490 C090 :
1495 C095 :
1500 C100 :
1505 C105 :
1510 C110 :
1515 C115 :
1520 C120 :
1525 C125 :
1530 C130 :
1535 C135 :
1540 C140 :
1545 C145 :
1550 C150 :
1555 C155 :
1560 C160 :
1565 C165 :
1570 C170 :
1575 C175 :
1580 C180 :
1585 C185 :
1590 C190 :
1595 C195 :
1600 C200 :
1605 C205 :
1610 C210 :
1615 C215 :
1620 C220 :
1625 C225 :
1630 C230 :
1635 C235 :
1640 C240 :
1645 C245 :
1650 C250 :
1655 C255 :
1660 C260 :
1665 C265 :
1670 C270 :
1675 C275 :
1680 C280 :
1685 C285 :
1690 C290 :
1695 C295 :
1700 C300 :
1705 C305 :
1710 C310 :
1715 C315 :
1720 C320 :
1725 C325 :
1730 C330 :
1735 C335 :
1740 C340 :
1745 C345 :
1750 C350 :
1755 C355 :
1760 C360 :
1765 C365 :
1770 C370 :
1775 C375 :
1780 C380 :
1785 C385 :
1790 C390 :
1795 C395 :
1800 C400 :
1805 C405 :
1810 C410 :
1815 C415 :
1820 C420 :
1825 C425 :
1830 C430 :
1835 C435 :
1840 C440 :
1845 C445 :
1850 C450 :
1855 C455 :
1860 C460 :
1865 C465 :
1870 C470 :
1875 C475 :
1880 C480 :
1885 C485 :
1890 C490 :
1895 C495 :
1900 C500 :
1905 C505 :
1910 C510 :
1915 C515 :
1920 C520 :
1925 C525 :
1930 C530 :
1935 C535 :
1940 C540 :
1945 C545 :
1950 C550 :
1955 C555 :
1960 C560 :
1965 C565 :
1970 C570 :
1975 C575 :
1980 C580 :
1985 C585 :
1990 C590 :
1995 C595 :
2000 C600 :
2005 C605 :
2010 C610 :
2015 C615 :
2020 C620 :
2025 C625 :
2030 C630 :
2035 C635 :
2040 C640 :
2045 C645 :
2050 C650 :
2055 C655 :
2060 C660 :
2065 C665 :
2070 C670 :
2075 C675 :
2080 C680 :
2085 C685 :
2090 C690 :
2095 C695 :
2100 C700 :
2105 C705 :
2110 C710 :
2115 C715 :
2120 C720 :
2125 C725 :
2130 C730 :
2135 C735 :
2140 C740 :
2145 C745 :
2150 C750 :
2155 C755 :
2160 C760 :
2165 C765 :
2170 C770 :
2175 C775 :
2180 C780 :
2185 C785 :
2190 C790 :
2195 C795 :
2200 C800 :
2205 C805 :
2210 C810 :
2215 C815 :
2220 C820 :
2225 C825 :
2230 C830 :
2235 C835 :
2240 C840 :
2245 C845 :
2250 C850 :
2255 C855 :
2260 C860 :
2265 C865 :
2270 C870 :
2275 C875 :
2280 C880 :
2285 C885 :
2290 C890 :
2295 C895 :
2300 C900 :
2305 C905 :
2310 C910 :
2315 C915 :
2320 C920 :
2325 C925 :
2330 C930 :
2335 C935 :
2340 C940 :
2345 C945 :
2350 C950 :
2355 C955 :
2360 C960 :
2365 C965 :
2370 C970 :
2375 C975 :
2380 C980 :
2385 C985 :
2390 C990 :
2395 C995 :
2400 C1000 :
2405 C1005 :
2410 C1010 :
2415 C1015 :
2420 C1020 :
2425 C1025 :
2430 C1030 :
2435 C1035 :
2440 C1040 :
2445 C1045 :
2450 C1050 :
2455 C1055 :
2460 C1060 :
2465 C1065 :
2470 C1070 :
2475 C1075 :
2480 C1080 :
2485 C1085 :
2490 C1090 :
2495 C1095 :
2500 C1100 :
2505 C1105 :
2510 C1110 :
2515 C1115 :
2520 C1120 :
2525 C1125 :
2530 C1130 :
2535 C1135 :
2540 C1140 :
2545 C1145 :
2550 C1150 :
2555 C1155 :
2560 C1160 :
2565 C1165 :
2570 C1170 :
2575 C1175 :
2580 C1180 :
2585 C1185 :
2590 C1190 :
2595 C1195 :
2600 C1200 :
2605 C1205 :
2610 C1210 :
2615 C1215 :
2620 C1220 :
2625 C1225 :
2630 C1230 :
2635 C1235 :
2640 C1240 :
2645 C1245 :
2650 C1250 :
2655 C1255 :
2660 C1260 :
2665 C1265 :
2670 C1270 :
2675 C1275 :
2680 C1280 :
2685 C1285 :
2690 C1290 :
2695 C1295 :
2700 C1300 :
2705 C1305 :
2710 C1310 :
2715 C1315 :
2720 C1320 :
2725 C1325 :
2730 C1330 :
2735 C1335 :
2740 C1340 :
2745 C1345 :
2750 C1350 :
2755 C1355 :
2760 C1360 :
2765 C1365 :
2770 C1370 :
2775 C1375 :
2780 C1380 :
2785 C1385 :
2790 C1390 :
2795 C1395 :
2800 C1400 :
2805 C1405 :
2810 C1410 :
2815 C1415 :
2820 C1420 :
2825 C1425 :
2830 C1430 :
2835 C1435 :
2840 C1440 :
2845 C1445 :
2850 C1450 :
2855 C1455 :
2860 C1460 :
2865 C1465 :
2870 C1470 :
2875 C1475 :
2880 C1480 :
2885 C1485 :
2890 C1490 :
2895 C1495 :
2900 C1500 :
2905 C1505 :
2910 C1510 :
2915 C1515 :
2920 C1520 :
2925 C1525 :
2930 C1530 :
2935 C1535 :
2940 C1540 :
2945 C1545 :
2950 C1550 :
2955 C1555 :
2960 C1560 :
2965 C1565 :
2970 C1570 :
2975 C1575 :
2980 C1580 :
2985 C1585 :
2990 C1590 :
2995 C1595 :
3000 C1600 :
3005 C1605 :
3010 C1610 :
3015 C1615 :
3020 C1620 :
3025 C1625 :
3030 C1630 :
3035 C1635 :
3040 C1640 :
3045 C1645 :
3050 C1650 :
3055 C1655 :
3060 C1660 :
3065 C1665 :
3070 C1670 :
3075 C1675 :
3080 C1680 :
3085 C1685 :
3090 C1690 :
3095 C1695 :
3100 C1700 :
3105 C1705 :
3110 C1710 :
3115 C1715 :
3120 C1720 :
3125 C1725 :
3130 C1730 :
3135 C1735 :
3140 C1740 :
3145 C1745 :
3150 C1750 :
3155 C1755 :
3160 C1760 :
3165 C1765 :
3170 C1770 :
3175 C1775 :
3180 C1780 :
3185 C1785 :
3190 C1790 :
3195 C1795 :
3200 C1800 :
3205 C1805 :
3210 C1810 :
3215 C1815 :
3220 C1820 :
3225 C1825 :
3230 C1830 :
3235 C1835 :
3240 C1840 :
3245 C1845 :
3250 C1850 :
3255 C1855 :
3260 C1860 :
3265 C1865 :
3270 C1870 :
3275 C1875 :
3280 C1880 :
3285 C1885 :
3290 C1890 :
3295 C1895 :
3300 C1900 :
3305 C1905 :
3310 C1910 :
3315 C1915 :
3320 C1920 :
3325 C1925 :
3330 C1930 :
3335 C1935 :
3340 C1940 :
3345 C1945 :
3350 C1950 :
3355 C1955 :
3360 C1960 :
3365 C1965 :
3370 C1970 :
3375 C1975 :
3380 C1980 :
3385 C1985 :
3390 C1990 :
3395 C1995 :
3400 C2000 :
3405 C2005 :
3410 C2010 :
3415 C2015 :
3420 C2020 :
3425 C2025 :
3430 C2030 :
3435 C2035 :
3440 C2040 :
3445 C2045 :
3450 C2050 :
3455 C2055 :
3460 C2060 :
3465 C2065 :
3470 C2070 :
3475 C2075 :
3480 C2080 :
3485 C2085 :
3490 C2090 :
3495 C2095 :
3500 C2100 :
3505 C2105 :
3510 C2110 :
3515 C2115 :
3520 C2120 :
3525 C2125 :
3530 C2130 :
3535 C2135 :
3540 C2140 :
3545 C2145 :
3550 C2150 :
3555 C2155 :
3560 C2160 :
3565 C2165 :
3570 C2170 :
3575 C2175 :
3580 C2180 :
3585 C2185 :
3590 C2190 :
3595 C2195 :
3600 C2200 :
3605 C2205 :
3610 C2210 :
3615 C2215 :
3620 C2220 :
3625 C2225 :
3630 C2230 :
3635 C2235 :
3640 C2240 :
3645 C2245 :
3650 C2250 :
3655 C2255 :
3660 C2260 :
3665 C2265 :
3670 C2270 :
3675 C2275 :
3680 C2280 :
3685 C2285 :
3690 C2290 :
3695 C2295 :
3700 C2300 :
3705 C2305 :
3710 C2310 :
3715 C2315 :
3720 C2320 :
3725 C2325 :
3730 C2330 :
3735 C2335 :
3740 C2340 :
3745 C2345 :
3750 C2350 :
3755 C2355 :
3760 C2360 :
3765 C2365 :
3770 C2370 :
3775 C2375 :
3780 C2380 :
3785 C2385 :
3790 C2390 :
3795 C2395 :
3800 C2400 :
3805 C2405 :
3810 C2410 :
3815 C2415 :
3820 C2420 :
3825 C2425 :
3830 C2430 :
3835 C2435 :
3840 C2440 :
3845 C2445 :
3850 C2450 :
3855 C2455 :
3860 C2460 :
3865 C2465 :
3870 C2470 :
3875 C2475 :
3880 C2480 :
3885 C2485 :
3890 C2490 :
3895 C2495 :
3900 C2500 :
3905 C2505 :
3910 C2510 :
3915 C2515 :
3920 C2520 :
3925 C2525 :
3930 C2530 :
3935 C2535 :
3940 C2540 :
3945 C2545 :
3950 C2550 :
3955 C2555 :
3960 C2560 :
3965 C2565 :
3970 C2570 :
3975 C2575 :
3980 C2580 :
3985 C2585 :
3990 C2590 :
3995 C2595 :
4000 C2600 :
4005 C2605 :
4010 C2610 :
4015 C2615 :
4020 C2620 :
4025 C2625 :
4030 C2630 :
4035 C2635 :
4040 C2640 :
4045 C2645 :
4050 C2650 :
4055 C2655 :
4060 C2660 :
4065 C2665 :
4070 C2670 :
4075 C2675 :
4080 C2680 :
4085 C2685 :
4090 C2690 :
4095 C2695 :
4100 C2700 :
4105 C2705 :
4110 C2710 :
4115 C2715 :
4120 C2720 :
4125 C2725 :
4130 C2730 :
4135 C2735 :
4140 C2740 :
4145 C2745 :
4150 C2750 :
4155 C2755 :
4160 C2760 :
4165 C2765 :
4170 C2770 :
4175 C2775 :
4180 C2780 :
4185 C2785 :
4190 C2790 :
4195 C2795 :
4200 C2800 :
4205 C2805 :
4210 C2810 :
4215 C2815 :
4220 C2820 :
4225 C2825 :
4230 C2830 :
4235 C2835 :
4240 C2840 :
4245 C2845 :
4250 C2850 :
4255 C2855 :
4260 C2860 :
4265 C2865 :
4270 C2870 :
4275 C2875 :
4280 C2880 :
4285 C2885 :
4290 C2890 :
4295 C2895 :
4300 C2900 :
4305 C2905 :
4310 C2910 :
4315 C2915 :
4320 C2920 :
4325 C2925 :
4330 C2930 :
4335 C2935 :
4340 C2940 :
4345 C2945 :
4350 C2950 :
4355 C2955 :
4360 C2960 :
4365 C2965 :
4370 C2970 :
4375 C2975 :
4380 C2980 :
4385 C2985 :
4390 C2990 :
4395 C2995 :
4400 C3000 :
4405 C3005 :
4410 C3010 :
4415 C3015 :
4420 C3020 :
4425 C3025 :
4430 C3030 :
4435 C3035 :
4440 C3040 :
4445 C3045 :
4450 C3050 :
4455 C3055 :
4460 C3060 :
4465 C3065 :
4470 C3070 :
4475 C3075 :
4480 C3080 :
4485 C3085 :
4490 C3090 :
4495 C3095 :
4500 C3100 :
4505 C3105 :
4510 C3110 :
4515 C3115 :
4520 C3120 :
4525 C3125 :
4530 C3130 :
4535 C3135 :
4540 C3140 :
4545 C3145 :
4550 C3150 :
4555 C3155 :
4560 C3160 :
4565 C3165 :
4570 C3170 :
4575 C3175 :
4580 C3180 :
4585 C3185 :
4590 C3190 :
4595 C3195 :
4600 C3200 :
4605 C3205 :
4610 C3210 :
4615 C3215 :
4620 C3220 :
4625 C3225 :
4630 C3230 :
4635 C3235 :
4640 C3240 :
4645 C3245 :
4650 C3250 :
4655 C3255 :
4660 C3260 :
4665 C3265 :
4670 C3270 :
4675 C3275 :
4680 C3280 :
4685 C3285 :
4690 C3290 :
4695 C3295 :
4700 C3300 :
4705 C3305 :
4710 C3310 :
4715 C3315 :
4720 C3320 :
4725 C3325 :
4730 C3330 :
4735 C3335 :
4740 C3340 :
4745 C3345 :
4750 C3350 :
4755 C3355 :
4760 C3360 :
4765 C3365 :
4770 C3370 :
4775 C3375 :
4780 C3380 :
4785 C3385 :
4790 C3390 :
4795 C3395 :
4800 C3400 :
4805 C3405 :
4810 C3410 :
4815 C3415 :
4820 C3420 :
4825 C3425 :
4830 C3430 :
4835 C3435 :
4840 C3440 :
4845 C3445 :
4850 C3450 :
4855 C3455 :
4860 C3460 :
4865 C3465 :
4870 C3470 :
4875 C3475 :
4880 C3480 :
4885 C3485 :
4890 C3490 :
4895 C3495 :
4900 C3500 :
4905 C3505 :
4910 C3510 :
4915 C3515 :
4920 C3520 :
4925 C3525 :
4930 C3530 :
4935 C3535 :
4940 C3540 :
4945 C3545 :
4950 C3550 :
4955 C3555 :
4960 C3560 :
4965 C3565 :
4970 C3570 :
4975 C3575 :
4980 C3580 :
4985 C3585 :
4990 C3590 :
4995 C3595 :
5000 C3600 :
5005 C3605 :
5010 C3610 :
5015 C3615 :
5020 C3620 :
5025 C3625 :
5030 C3630 :
5035 C3635 :
5040 C3640 :
5045 C3645 :
5050 C3650 :
5055 C3655 :
5060 C3660 :
5065 C3665 :
5070 C3670 :
5075 C3675 :
5080 C3680 :
5085 C3685 :
5090 C3690 :
5095 C3695 :
5100 C3700 :
5105 C3705 :
5110 C3710 :
5115 C3715 :
5120 C3720 :
5125 C3725 :
5130 C3730 :
5135 C3735 :
5140 C3740 :
5145 C3745 :
5150 C3750 :
5155 C3755 :
5160 C3760 :
5165 C3765 :
5170 C3770 :
5175 C3775 :
5180 C3780 :
5185 C3785 :
5190 C3790 :
5195 C3795 :
5200 C3800 :
5205 C3805 :
5210 C3810 :
5215 C3815 :
5220 C3820 :
5225 C3825 :
5230 C3830 :
5235 C3835 :
5240 C3840 :
5245 C3845 :
5250 C3850 :
5255 C3855 :
5260 C3860 :
5265 C3865 :
5270 C3870 :
5275 C3875 :
5280 C3880 :
5285 C3885 :
5290 C3890 :
5295 C3895 :
5300 C3900 :
5305 C3905 :
5310 C3910 :
5315 C3915 :
5320 C3920 :
5325 C3925 :
5330 C3930 :
5335 C3935 :
5340 C3940 :
5345 C3945 :
5350 C3950 :
5355 C3955 :
5360 C3960 :
5365 C3965 :
5370 C3970 :
5375 C3975 :
5380 C3980 :
5385 C3985 :
5390 C3990 :
5395 C3995 :
5400 C4000 :
5405 C4005 :
5410 C4010 :
5415 C4015 :
5420 C4020 :
5425 C4025 :
5430 C4030 :
5435 C4035 :
5440 C4040 :
5445 C4045 :
5450 C4050 :
5455 C4055 :
5460 C4060 :
5465 C4065 :
5470 C4070 :
5475 C4075 :
5480 C4080 :
5485 C4085 :
5490 C4090 :
5495 C4095 :
5500 C4100 :
5505 C4105 :
5510 C4110 :
5515 C4115 :
5520 C4120 :
5525 C4125 :
5530 C4130 :
5535 C4135 :
5540 C4140 :
5545 C4145 :
5550 C4150 :
5555 C4155 :
5560 C4160 :
5565 C4165 :
5570 C4170 :
5575 C4175 :
5580 C4180 :
5585 C4185 :
5590 C4190 :
5595 C4195 :
5600 C4200 :
5605 C4205 :
5610 C4210 :
5615 C4215 :
5620 C4220 :
5625 C4225 :
5630 C4230 :
5635 C4235 :
5640 C4240 :
5645 C4245 :
5650 C4250 :
5655 C4255 :
5660 C4260 :
5665 C4265 :
5670 C4270 :
5675 C4275 :
5680 C4280 :
5685 C4285 :
5690 C4290 :
5695 C4295 :
5700 C4300 :
5705 C4305 :
5710 C4310 :
5715 C4315 :
5720 C4320 :
5725 C4325 :
5730 C4330 :
5735 C4335 :
5740 C4340 :
5745 C4345 :
5750 C4350 :
5755 C4355 :
5760 C4360 :
5765 C4365 :
5770 C4370 :
5775 C4375 :
5780 C4380 :
5785 C4385 :
5790 C4390 :
5795 C4395 :
5800 C4400 :
5805 C4405 :
5810 C4410 :
5815 C4415 :
5820 C4420 :
5825 C4425 :
5830 C4430 :
5835 C4435 :
5840 C4440 :
5845 C4445 :
5850 C4450 :
5855 C4455 :
5860 C4460 :
5865 C4465 :
5870 C4470 :
5875 C4475 :
5880 C4480 :
5885 C4485 :
5890 C4490 :
5895 C4495 :
5900 C4500 :
5905 C4505 :
5910 C4510 :
5915 C4515 :
5920 C4520 :
5925 C4525 :
5930 C4530 :
5935 C4535 :
5940 C4540 :
5945 C4545 :
5950 C4550 :
5955 C4555 :
5960 C4560 :
5965 C4565 :
5970 C4570 :
5975 C4575 :
5980 C4580 :
5985 C4585 :
5990 C4590 :
5995 C4595 :
6000 C4600 :
6005 C4605 :
6010 C4610 :
6015 C4615 :
6020 C4620 :
6025 C4625 :
6030 C4630 :
6035 C4635 :
6040 C4640 :
6045 C4645 :
6050 C4650 :
6055 C4655 :
6060 C4660 :
6065 C4665 :
6070 C4670 :
6075 C4675 :
6080 C4680 :
6085 C4685 :
6090 C4690 :
6095 C4695 :
6100 C4700 :
6105 C4705 :
6110 C4710 :
6115 C4715 :
6120 C4720 :
6125 C4725 :
6130 C4730 :
6135 C4735 :
6140 C4740 :
6145 C4745 :
6150 C4750 :
6155 C4755 :
6160 C4760 :
6165 C4765 :
6170 C4770 :
6175 C4775 :
6180 C4780 :
6185 C4785 :
6190 C4790 :
6195 C4795 :
6200 C4800 :
6205 C4805 :
6210 C4810 :
6215 C4815 :
6220 C4820 :
6225 C4825 :
6230 C4830 :
6235 C4835 :
6240 C4840 :
6245 C4845 :
6250 C4850 :
6255 C4855 :
6260 C4860 :
6265 C4865 :
6270 C4870 :
6275 C4875 :
6280 C4880 :
6285 C4885 :
6290 C4890 :
6295 C4895 :
6300 C4900 :
6305 C4905 :
6310 C4910 :
6315 C4915 :
6320 C4920 :
6325 C4925 :
6330 C4930 :
6335 C4935 :
6340 C4940 :
6345 C4945 :
6350 C4950 :
6355 C4955 :
6360 C4960 :
6365 C4965 :
6370 C4970 :
6375 C4975 :
6380 C4980 :
6385 C4985 :
6390 C4990 :
6395 C4995 :
6400 C5000 :
6405 C5005 :
6410 C5010 :
6415 C5015 :
6420 C5020 :
6425 C5025 :
6430 C5030 :
6435 C5035 :
6440 C5040 :
6445 C5045 :
6450 C5050 :
6455 C5055 :
6460 C5060 :
6465 C5065 :
6470 C5070 :
6475 C5075 :
6480 C5080 :
6485 C5085 :
6490 C5090 :
6495 C5095 :
6500 C5100 :
6505 C5105 :
6510 C5110 :
6515 C5115 :
6520 C5120 :
6525 C5125 :
6530 C5130 :
6535 C5135 :
6540 C5140 :
6545 C5145 :
6550 C5150 :
6555 C5155 :
6560 C5160 :
6565 C5165 :
6570 C5170 :
6575 C5175 :
6580 C5180 :
6585 C5185 :
6590 C5190 :
6595 C5195 :
6600 C5200 :
6605 C5205 :
6610 C5210 :
6615 C5215 :
6620 C5220 :
6625 C5225 :
6630 C5230 :
6635 C5235 :
6640 C5240 :
6645 C5245 :
6650 C5250 :
6655 C5255 :
6660 C5260 :
6665 C5265 :
6670 C5270 :
6675 C5275 :
6680 C5280 :
6685 C5285 :
6690 C5290 :
6695 C5295 :
6700 C5300 :
6705 C5305 :
6710 C5310 :
6715 C5315 :
6720 C5320 :
6725 C5325 :
6730 C5330 :
6735 C5335 :
6740 C5340 :
6745 C5345 :
6750 C5350 :
6755 C5355 :
6760 C5360 :
6765 C5365 :
6770 C5370 :
6775 C5375 :
6780 C5380 :
6785 C5385 :
6790 C5390 :
6795 C5395 :
6800 C5400 :
6805 C5405 :
6810 C5410 :
6815 C5415 :
6820 C5420 :
6825 C5425 :
6830 C5430 :
6835 C5435 :
6840 C5440 :
6845 C5445 :
6850 C5450 :
6855 C5455 :
6860 C5460 :
6865 C5465 :
6870 C5470 :
6875 C5475 :
6880 C5480 :
6885 C5485 :
6890 C5490 :
6895 C5495 :
6900 C5500 :
6905 C5505 :
6910 C5510 :
6915 C5515 :
6920 C5520 :
6925 C5525 :
6930 C5530 :
6935 C5535 :
6940 C5540 :
6945 C5545 :
6950 C5550 :
6955 C5555 :
6960 C5560 :
6965 C5565 :
6970 C5570 :
6975 C5575 :
6980 C5580 :
6985 C5585 :
6990 C5590 :
6995 C5595 :
7000 C5
```


COMMODORE SOFTWARE FILE

UFO

DESTROY THE rapidly increasing UFO to
in our country.

Program 604
2000-2001

9002 Helmut Int
 9003 9009 Cover record
 9004-9008 Move: LRP
 9009 9017 Information
 1000 2-9000 Information
 9000-9013 GSA, Inc. standards

Plasma-derived albumin: 100 g (1000 ml) contains 20 g of albumin

[illegible]

[illegible]

77. **ANSWER: B**
78. **ANSWER: C**

Table 1

- 14 4-bit values
- 15 screen and border black
- 16 generate 43 rows to produce
PRINT A's
- 20 store message during data
message
- 21 clear sound flag
- 22 volume to maximum
- 23 set up wait-form and state for
wait 1
- 32 initial minutes
- 34 send off 48-hour message and
beep with 10 characters
- 35 read memory character out to
8084 to 0x0e
- 40 search in I/O
- 41 set start keyword message into
42 flag variable
- 43 define div, and graphics
- 44 define Constant 4 line only
- 45 set maximum code number
- 70 read page number to check for
correct data
- 81 set character pointer to 1000h
82 set page number into page machine
code routine
- 83 70 new file table page
- 84 expand space in 4 and 5
- 90 10 digit shape, location and code
of space
- 117 search for spaces

- 114 check for gates or slats
- 116 switch T on G
- 118 press keyboard
- 120 check the number of cycles on key pressed
- 122 checks for F1 or F2
- 124 wait till no key pressed
- 130 clear screen colour black
- 132 keys keyboard for
- 134-140 define shape and colour of dots
- 142 on screen variation
- 144-146 print dot number at bottom of screen
- 151 check for key pressed, wait, set value I
- 154 switch off C, energy A
- 156 if I1 clear screen print data on next game
- 158 A F2 recall restrictions
- 160 of outside range return on I12
- 162 move on screen I
- 164 call position of dot, dot screen
- 166 if dot space then return to F12
- 172 draw dot, if printed
- 174 print on dot
- 176 calculate new position
- 178 delay loop
- 180 if new position space then change count and return to F12
- 182-184 change vol on of dot
- 186 clear keyboard buffer reset a return to F12
- 190-198 calculate on dot for graphics
- 204-208 space chain for unit print
- 206-214 on screen, ends data

1000

- A *avrei un venduto che è*
 B *generalmente più preso*
 S *che, piuttosto in a*
 V *che, piuttosto in a*
 G9 *avrei più preso che di che,*
 B9 *avrei un venduto che è*
 S2 *che, piuttosto in a*
 V2 *che, piuttosto in a*
 G10 *avrei più preso che di che,*
 B10 *avrei un venduto che è*
 S3 *che, piuttosto in a*
 V3 *che, piuttosto in a*
 G11 *avrei più preso che di che,*
 B11 *avrei un venduto che è*
 S4 *che, piuttosto in a*
 V4 *che, piuttosto in a*
 G12 *avrei più preso che di che,*
 B12 *avrei un venduto che è*
 S5 *che, piuttosto in a*
 V5 *che, piuttosto in a*

```

12 REM **** CLEAR SCREEN , SET INITIAL VARIABLES ****
13 PRINTCHR$(147)
14 %C=50048 :FOR%VC=12.8 :POKE%VC+33,8
15 REM *****
16 PRINTLEFT$="H:13 SPD CURE:5"SETTING UP CHARACTER SET"
23 FOR%I=1024 :POKE54272+%I,0 NEXT
24 POKE54256,13
26 POKE54276,32 :POKE54277,24 :POKE54278,40 :POKE54273,8 :POKE54272,147
28
30 REM **** PROTECT MEMORY , TRANSFER DATA FROM ROM TO RAM ****
31 POKE5144,POKE56,48
32 POKE54264,PEEK(50304,40)334
36 POKE1,PEEK(1,40)331
38 PORT=870004% :POKE14300+T,PEEK(503248+T) NEXT
40 POKE1,PEEK(1,0)44
42 POKE56344,PEEK(56304,0)1
44
46 POKE **** SET UP CHARACTERS ****
47 T=0 :SUM=0
50 REMOR IF%I=-1THENPOKE15064+T,H :T=T+1 :SUM=SUM+R :GOTO53
51
54 REM **** SET UP SPACES ****
55 T=0
58 REMOR IF%I=-1THENPOKE12844+T,H :T=T+1 :SUM=SUM+R :GOTO58
59
62 REM **** SET UP MACHINE CODE ROUTINE ****
63 T=0
66 REMOR IF%I=-1THENPOKE40152+T,R :T=T+1 :SUM=SUM+R :GOTO66
67
70 REM **** LPROC TRAP ROUTINE ****
72 IF%I=15564AND%I=PRINTCHR$(147) :OR%I=5:TRAP=5:"GARP IN DATA STATEMENT"
73
74 POKE%VC+24, :PEEK(1)+24,AND%VC+24
75
76 REM **** SET UP TITLE ****
80 PRINTCHR$(147) :POKE56352

```


DUCKWORTH HOME COMPUTING

A DUCKWORTH COMPANY

All kinds of computer software for the Commodore 64. From simple to sophisticated. From educational to business. From word processing to spreadsheets. From games to graphics. From music to more. From home to office. From now to later. From Duckworth to you.

USING THE COMMODORE 64 Printer Command

A complete book on the Commodore 64 Printer Command. This book contains all the information you need to know to use the Commodore 64 Printer Command. It covers the basics of the Commodore 64 Printer Command, and then goes on to show you how to use it to print out your own documents. It includes a complete list of the commands and their functions, and a detailed explanation of how to use them. It also includes a complete list of the errors and their causes, and a detailed explanation of how to fix them.

Special Computer Store sale. In this sale, we are giving away a copy of the book for free. To get a copy, you must order the book for £14.95. The book is worth £14.95. The book is worth £14.95. The book is worth £14.95.

THE COMMODORE 64 PRINTER AND COMMODORE 64 PRINTER

Printed for the Commodore 64 Printer Command. This book contains all the information you need to know to use the Commodore 64 Printer Command. It covers the basics of the Commodore 64 Printer Command, and then goes on to show you how to use it to print out your own documents. It includes a complete list of the commands and their functions, and a detailed explanation of how to use them. It also includes a complete list of the errors and their causes, and a detailed explanation of how to fix them.

Order today and receive your copy of the book for free. To get a copy, you must order the book for £14.95. The book is worth £14.95. The book is worth £14.95. The book is worth £14.95.

Write to: Duckworth, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.



DUCKWORTH

The Old Farm House, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

Superbase

Superbase is the most powerful database management system available for the Commodore 64. It can handle up to 1,000,000 records and 100 fields. It can be used to create and maintain a database of names, addresses, phone numbers, etc. It can also be used to create and maintain a database of inventory, sales, etc. It is a very powerful and flexible system that can be used in a wide variety of applications.

SPECIAL OFFER PRICE £49.95 - £29.95

Superscript II

Superscript II is the most powerful word processing system available for the Commodore 64. It can handle up to 1,000,000 characters and 100 pages. It can be used to create and maintain a database of names, addresses, phone numbers, etc. It can also be used to create and maintain a database of inventory, sales, etc. It is a very powerful and flexible system that can be used in a wide variety of applications.

SPECIAL OFFER PRICE £49.95 - £29.95

Master

Master is the most powerful spreadsheet system available for the Commodore 64. It can handle up to 1,000,000 cells and 100 columns. It can be used to create and maintain a database of names, addresses, phone numbers, etc. It can also be used to create and maintain a database of inventory, sales, etc. It is a very powerful and flexible system that can be used in a wide variety of applications.

Master is the most powerful spreadsheet system available for the Commodore 64. It can handle up to 1,000,000 cells and 100 columns. It can be used to create and maintain a database of names, addresses, phone numbers, etc. It can also be used to create and maintain a database of inventory, sales, etc. It is a very powerful and flexible system that can be used in a wide variety of applications.

Calco Software

100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366

[illegible]

Blockbuster

Figure 2 *Mean values of the variables measured in the study*

[illegible]

A USEFUL book for the student. Blackboard is

■ **CHARACTER GENERATOR** using words without
number

Unlike most processors, it works on a 2×2 block of luminance samples, the build-up of which requires image. The channels are built on a large scale image of 16×34 bits, with full color control. Keys A, B, C and C' create the 4 outputs. Some

Background and Character selection, recruitment, and Exposure

Immediately a colour is entered it appears on the left-hand display as the scale — so you can at once see the result. The character data is displayed on a screen on a light 80 bits and character by character basis, both on demand and by a 100, 500-bit and 1000-bit.

MR CHIP SOFTWARE

VIC 20 GAMES AND UTILITIES

JACKPOT

This is the ultimate Fruit Machine for the VIC with multi-fold and super 100% machine code. "Overall Jackpot" is a beautifully written, sensitive, springy, superb graphics, sensitive and use of colour. In fact, this program makes Commodore's Fruit Machine cartridge look underdeveloped, cheap and silly. "Home Computing Weekly No. 2019-17-83" **£5.50**

EWALD'S KWALK

Accuracy and speed are required for this Shooting Gallery, superb use of colour and graphics in this new and challenging game from the author of *Devil's 100%* multi-fold code, joystick or keyboard control. **£5.50**

PACMANIA

Choose your own game from the following options — difficulty 1-3, speed 0-9, out of maze 0-9, enable or disable maze, still or moving power pellets, define your own fire controls, any combination, if this is your type of game then this is the one for you. For the 16 expansion VIC only. **£5.50**

BUGGY (joystick only)

This is a minefield with a difference as you step on the stones while dodging purple forces which give you both acid and poison, then disappear from beneath your feet. DO NOT DISPAIR "BUGGY" will certainly replace the more but avoid bumping 1000 times as its easier than 1. An original, computer and challenging game. **£5.50**

MINI-KOULETER — PONTON — BELLUM

Three great games of choice for the VIC. Try to beat the computer, hours of fun, full colour, sound effects and more. **£5.50**

DATABASE — create your own files and records on tape. **£5.50**

WIPER BANK MANAGER — A full feature version and memory use but needs 16 expansion. **£5.50**

COMMODORE 64 GAMES AND UTILITIES

JACKPOT 64

As for 65 there, specially written for the 64 by the author of "JACKPOT" the ultimate Fruit Machine program for the VIC. **£5.50**

WICKWINNER

A game for up to four players. Can you lead the party, of your choice and win the general election. You vote the 66 constituencies (some) having more where you vote first like the real thing. One more for one of the first board type games specially written for the computer. Why play on your own, have fun with your family and friends, playing WICKWINNER. **£5.50**

RED ALERT

A game for 1-4 players with sound and graphics. Make nuclear war, destroy, remove robbery, take back the police, have some agents come of which can be invulnerable, negotiate for weapons, find and attack the secret nuclear base to launch the missile and watch the havoc and destruction caused. There is an exciting last, from "RED ALERT" **£5.50**

WHOLEE DEALER

A game for two to four players. Become a dealer of the casino table, you must obtain gambler, spin and require the gambler can for sale. From machines, they are machine parts. Buy decisions, but be careful, you may become bankrupt and have to liquidate. Real and what you are made of, have you got what it takes to become a WHOLEE DEALER. **£5.50**

LUNAR RESCUE

Our new version, avoid the mirrored ball, to reach the mirrored asteroid, then fight you way back to the mirror ship, this version are required to early third and don't. Your home module. **£5.50**

PONTON — KOULETER — ACE'S HIGH — More powerful version, that make three great games of choice for the 64. **£5.50**

CHIPWIN

Contains a set of two part Assembly, Documentation and Manual. A programming aid for the development of machine code programs and contains details of 129 of 412.50

PURCHASE LEDGER

May be one, single entry, handles 400 entries per month, price cost purchase, VAT. **£14.50**
Disk Version **£17.50**
SALES LEADS - 40 sheets **£14.50**
£17.50

BANK MANAGER — As our Super Bank Manager, but for the 64. **£5.50**

New available on disc with added features. **£10.50**

Full documentation with all utility programs.
Send large SAE for free colour brochure including RABBIT SOFTWARE 85 notes.

Send Cheques/P.O.'s to:

MR CHIP SOFTWARE

Days HORIZONS 1 NEVILLE PLACE
LLANDUDNO, GYARNOED LL20 8BL
Tel 0492 48147

Wanted: High quality software, of all types, for export and UK distribution.

All programs now available on disc please allow £1.50
P.V.D.



DEALER (SOUTH) WELTON

ANIROG SOFTWARE

3499 CREDIT CARD SALES WORKER / 102504000
PAYMENT BY CHECK/ P.O., ACCESS VIA
A HIGH STREET MONEY ORDER
Overseas \$10p post & packaging

TRADE ENQUIRIES WELCOME
28 West Hill, Dartford, Kent. 03221835138

COMMODORE 64

KONG

KB / JS

£7.95

A 31 K ALL M/C PROGRAM WITH BRILLIANT ANIMATED GRAPHICS



1. CHOOSE THE BALLS AND BARRIERS
ON 10. INCREASED THE BALLS
ON THE LINE AND UP THE LINE



2. JUMP OVER THE BALLS AND THE BARRIERS
ON THE COMMODORE 64. THE BALLS
ON THE LINE AND UP THE LINE



3. THE BALLS ARE UP TO THE LINE
ON THE COMMODORE 64. THE BALLS
ON THE LINE AND UP THE LINE



4. THE BALLS ARE UP TO THE LINE
ON THE COMMODORE 64. THE BALLS
ON THE LINE AND UP THE LINE

SKRAMBLE

J/S

£7.95

PILOT YOUR SPACE CRAFT THROUGH THE 50 DEFENCE SECTORS AND DESTROY THE COMMAND MODULE OF THE
COBRON EMPIRE A 32 K ALL M/C BLOCKBUSSER



1. SKRAMBLE THE SPACE CRAFT
ON THE COMMODORE 64



2. SKRAMBLE THE SPACE CRAFT
ON THE COMMODORE 64



3. SKRAMBLE THE SPACE CRAFT
ON THE COMMODORE 64



4. SKRAMBLE THE SPACE CRAFT
ON THE COMMODORE 64



5. SKRAMBLE THE SPACE CRAFT
ON THE COMMODORE 64



6. SKRAMBLE THE SPACE CRAFT
ON THE COMMODORE 64

HEXPERT

J/S

£7.95

THE FIRST OF THE HEXPERT SERIES TO BE
RELEASED IN THE COMMODORE 64 SERIES
IS A 32 K ALL M/C BLOCKBUSSER
ON THE COMMODORE 64. THE BALLS
ON THE LINE AND UP THE LINE



MOON BUGGY

3D TIME TREK

DUNGEONS

FROG RUN



EXPERIENCE ALL THE THRILLS
OF THE ARCADE GAME AS
YOU RACE THE MOON BUGGY
ON THE COMMODORE 64



A 3D SPACE TREK GAME WITH
REAL ARCADE ACTION
ON THE COMMODORE 64



ENTER THE REALM OF
DUNGEONS WITH A 32 K ALL
M/C BLOCKBUSSER ON THE
COMMODORE 64



A POPULAR ARCADE GAME
BROUGHT TO LIFE WITH
BRILLIANT ANIMATED GRAPHICS

4.0

£7.95

KB / JS

£7.95

4.0

£7.95

KB / JS

£7.95


```

1 REM "BLOCKBUSTER", A LITTLE THING FOR
PLAYING WITH MULTI-COLOUR GRAPHICS.
2 REM
3 REM BY MICRO-ANTICS
4 REM
5 REM DON'T TYPE IN REM STATEMENTS
6 REM COL<> IS THE 4 COLOURS, H# IS FOR
HEX VALUES
10 DIMCOL(3):H#="0123456789ABCDEF"
20 INPUT"CONT OR DATA (C/D)":A#1:IFA#="D"
"GOTO290
30 PRINT"C" INPUT"SCREEN COL":COL(0)
40 INPUT"CHARAC COL":COL(2) IFCOL(2)>7
THENPRINT"STD COLOUR CODE ONLY"GOTO40
50 INPUT"BORDER COL":COL(1)
60 INPUT"AUXILY COL":COL(3)
61 REM SET SCREEN AND BORDER
70 POKE36873,COL(0)*214+COL(1)+8: POKE
36879,COL(3)*214
71 REM INC NO OF ROWS, DEC COLS, PROTECT
MEM, MOVE CHAR SET, LEN OF FBD BUFF-1.
80 PRINT"C" POKE36867,40:POKE36866,149:
POKE36869,255:POKE52,20:POKE56,20:POKE
649,1
81 REM CPEATE BLOCK CHAR AND BLANK.
90 FORI=0TO7:POKE7176+I,255:POKE7424+I,0
NEXT
97 REM LOOP TO PUT CHAR DATA ON SCREEN.
98 REM X IS CURSOR LINE, Y IS ROW, T1 IS
CURSOR POS, CHAR1 IS BLOCK.
99 REM SUB2000 CALCULATES CHAR BYTE (T)
AND BIT (T2)
100 X=0:Y=0:FORI=0TO192:T1=7680+X*21+Y:
POKET1,1:POKET1+1,1:DO SUB2000
101 REM C0 IS COLOUR TYPE OF BIT PAIR.
110 C0=(PEEK(T)AND3*2+T2)/2+T2:POKET1+30
720,COL(C0):POKET1+30721,COL(C0):DO SUB10
60:NEXTI
111 REM LOOP TO DISPLAY HI RES CHARS.
120 FORY=0TO1:FORX=0TO2:T=7722+10+Y*X*21:
POKET,2+3*Y+X:POKET+30720,COL(2)+0:NEXT
X,Y
121 REM START INPUT.
122 X=0:Y=0
123 REM T=CSR POSN, T2=COL POS OF T, TC=
COL AT CSR.
140 T=7680+X*21+Y:T2=T+30720:TC=PEEK(T2)
141 REM TIME TO CHANGE CSR COLOUR?
150 IFSEC=INT(T1/20)GOTO170
151 REM RESET CSR TIMER & CHANGE CSR COL
160 SEC=INT(T1/28):POKET2,HOTPEEK(T2)AND
7
161 REM D=VAL OF KEY PRESSED + SHIFT KEY
FACTOR, 64 IS NO KEY.
170 D=PEEK(197)+PEEK(653)*100:IFD=64GOTO
150
171 REM KEY PRESSED, RESTORE COL UNDER C
SR.
180 POKET,1:POKET2,TC
181 REM CALC GOTO NUMBER FOR KEY SELECTD
120 C0=-(8*(D=123))+7*(D=23)+6*(D=131)+5*
(D=31)+4*(D=17)+3*(D=34)+2*(D=35)+(D=41)

```



```

260 ONC000TO258,259,258,258,248,268,238,
278
218 IFDC<4900TO158
219 REM "E" KEY: NORMALISE SCRN AND RETH
TO START.
228 POKE36869,248:POKE36868,158:POKE3686
7,48:POKE36879,27:POKE631,0:GOTO28
229 REM CSR RIGHT
238 GOSUB1888:GOTO148
239 REM CPS DOWN
248 X=X+1:X=X*(1+(X>23)):GOTO148
249 REM PUT NEW COL IN AND GOSUB2888 TO
PUT IT IN HI RES CHAR.
258 POKE2,COL*(CO-1):POKE2+1,COL*(CO-1):
GOSUB2888:GOTO148
259 REM CSR UP
268 X=X-1:X=X-24*(X<8):GOTO148
269 REM CSR LEFT
278 Y=Y-2:Y=Y-16*(Y<8):IFY=1400TO268
279 REM GO BACK FOR MORE.
288 GOTO148
289 REM ROUTINE TO PRINT OUT DATA
298 PRINT"CHARACTER DATA":D=8
308 PRINT"XXXXXXXXXXXXXXXXXXXXXXXXXXXX"
318 FORCO=8TO7:T=PEEK(7184+D*8+CO):PRINT
T,"*HID#(H#,INT(T/16)+1,1):
319 REM LAST HEX CHAR, NB SPACE AFTER T.
328 PRINTMID$(CHR$(T AND15)+1,1):NEXTCO
338 INPUT"NEXT (Y/N)";A$:IFA$="Y"THEN
=(D+1)*-(DC-5):GOTO388
348 GOTO28
999 SUB1888 INCS X AND Y.
1888 Y=Y+2:X=X*(1+(Y<15)):Y=Y*(1+(Y>15)):
X=X*(1+(X>23)):RETURN
2888 GOSUB3888
2818 POKE1,(PEEK(T)AND(255-3*2*TT2))+((CO-
1)*2*TT2):GOSUB1888:RETURN
2999 REM T IS HI RES CHAR BYTE, T2 IS BI
T POSN.
3888 T=7184+24*(1+(Y<8))+X:T2=8-(Y-8*(1+
(Y<8))) :RETURN
4888 TO USE
4881 REM SELECT DATA OR CONTINUE
4882 UNDER CONT, ENTER THE FOUR COLOURS
4883 THEN CURRENT CONTENTS OF THE SIX CH
ARACTERS WILL BE DISPLAYED.
4884 THEN USE THE FOLLOWING KEYS TO CREA
TE YOUR CHARACTERS
4885 "E" TO EXIT, "C" FOR CHAR COL, "A"
FOR AUX COL, "B" FOR BORDER COL
4886 "S" FOR SCREEN COL. EACH COL TAKES
TWO PIXELS IN MULTI-COL MODE.
4887 MOVE AROUND THE SCREEN USING STAND
ARD CURSOR KEYS.

```

Astro Wars

From David Jones for the unimpaired Vic
THE PROGRAM runs for Astro Wars

are: Line 188 sets up the variables: Line 188
clears the screen and opens on the board.
Lines 190 to 198 set up the user defined
graphics: Lines 199 to 258 put you and the
ships on the screen: Lines 259 to 288 move
the ships and do various checks: Lines 289
to 488 move you and do more checks: Lines

489-588 is the hit routine and check to see
if you have any more left.

The program is for the unimpaired Vic
20 and was a project, but can easily be
changed to the use of Laya (lines 188-488).
Also the ship data has to be destroyed
several times.


```

100 REMARKS TWO MORE BY DAVIS, PAGES 44
101 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69 71 73 75 77 79 81 83 85 87 89 91 93 95 97 99 101 103 105 107 109 111 113 115 117 119 121 123 125 127 129 131 133 135 137 139 141 143 145 147 149 151 153 155 157 159 161 163 165 167 169 171 173 175 177 179 181 183 185 187 189 191 193 195 197 199 201 203 205 207 209 211 213 215 217 219 221 223 225 227 229 231 233 235 237 239 241 243 245 247 249 251 253 255 257 259 261 263 265 267 269 271 273 275 277 279 281 283 285 287 289 291 293 295 297 299 301 303 305 307 309 311 313 315 317 319 321 323 325 327 329 331 333 335 337 339 341 343 345 347 349 351 353 355 357 359 361 363 365 367 369 371 373 375 377 379 381 383 385 387 389 391 393 395 397 399 401 403 405 407 409 411 413 415 417 419 421 423 425 427 429 431 433 435 437 439 441 443 445 447 449 451 453 455 457 459 461 463 465 467 469 471 473 475 477 479 481 483 485 487 489 491 493 495 497 499 501 503 505 507 509 511 513 515 517 519 521 523 525 527 529 531 533 535 537 539 541 543 545 547 549 551 553 555 557 559 561 563 565 567 569 571 573 575 577 579 581 583 585 587 589 591 593 595 597 599 601 603 605 607 609 611 613 615 617 619 621 623 625 627 629 631 633 635 637 639 641 643 645 647 649 651 653 655 657 659 661 663 665 667 669 671 673 675 677 679 681 683 685 687 689 691 693 695 697 699 701 703 705 707 709 711 713 715 717 719 721 723 725 727 729 731 733 735 737 739 741 743 745 747 749 751 753 755 757 759 761 763 765 767 769 771 773 775 777 779 781 783 785 787 789 791 793 795 797 799 801 803 805 807 809 811 813 815 817 819 821 823 825 827 829 831 833 835 837 839 841 843 845 847 849 851 853 855 857 859 861 863 865 867 869 871 873 875 877 879 881 883 885 887 889 891 893 895 897 899 901 903 905 907 909 911 913 915 917 919 921 923 925 927 929 931 933 935 937 939 941 943 945 947 949 951 953 955 957 959 961 963 965 967 969 971 973 975 977 979 981 983 985 987 989 991 993 995 997 999 1001 1003 1005 1007 1009 1011 1013 1015 1017 1019 1021 1023 1025 1027 1029 1031 1033 1035 1037 1039 1041 1043 1045 1047 1049 1051 1053 1055 1057 1059 1061 1063 1065 1067 1069 1071 1073 1075 1077 1079 1081 1083 1085 1087 1089 1091 1093 1095 1097 1099 1101 1103 1105 1107 1109 1111 1113 1115 1117 1119 1121 1123 1125 1127 1129 1131 1133 1135 1137 1139 1141 1143 1145 1147 1149 1151 1153 1155 1157 1159 1161 1163 1165 1167 1169 1171 1173 1175 1177 1179 1181 1183 1185 1187 1189 1191 1193 1195 1197 1199 1201 1203 1205 1207 1209 1211 1213 1215 1217 1219 1221 1223 1225 1227 1229 1231 1233 1235 1237 1239 1241 1243 1245 1247 1249 1251 1253 1255 1257 1259 1261 1263 1265 1267 1269 1271 1273 1275 1277 1279 1281 1283 1285 1287 1289 1291 1293 1295 1297 1299 1301 1303 1305 1307 1309 1311 1313 1315 1317 1319 1321 1323 1325 1327 1329 1331 1333 1335 1337 1339 1341 1343 1345 1347 1349 1351 1353 1355 1357 1359 1361 1363 1365 1367 1369 1371 1373 1375 1377 1379 1381 1383 1385 1387 1389 1391 1393 1395 1397 1399 1401 1403 1405 1407 1409 1411 1413 1415 1417 1419 1421 1423 1425 1427 1429 1431 1433 1435 1437 1439 1441 1443 1445 1447 1449 1451 1453 1455 1457 1459 1461 1463 1465 1467 1469 1471 1473 1475 1477 1479 1481 1483 1485 1487 1489 1491 1493 1495 1497 1499 1501 1503 1505 1507 1509 1511 1513 1515 1517 1519 1521 1523 1525 1527 1529 1531 1533 1535 1537 1539 1541 1543 1545 1547 1549 1551 1553 1555 1557 1559 1561 1563 1565 1567 1569 1571 1573 1575 1577 1579 1581 1583 1585 1587 1589 1591 1593 1595 1597 1599 1601 1603 1605 1607 1609 1611 1613 1615 1617 1619 1621 1623 1625 1627 1629 1631 1633 1635 1637 1639 1641 1643 1645 1647 1649 1651 1653 1655 1657 1659 1661 1663 1665 1667 1669 1671 1673 1675 1677 1679 1681 1683 1685 1687 1689 1691 1693 1695 1697 1699 1701 1703 1705 1707 1709 1711 1713 1715 1717 1719 1721 1723 1725 1727 1729 1731 1733 1735 1737 1739 1741 1743 1745 1747 1749 1751 1753 1755 1757 1759 1761 1763 1765 1767 1769 1771 1773 1775 1777 1779 1781 1783 1785 1787 1789 1791 1793 1795 1797 1799 1801 1803 1805 1807 1809 1811 1813 1815 1817 1819 1821 1823 1825 1827 1829 1831 1833 1835 1837 1839 1841 1843 1845 1847 1849 185
```

Singing Roller Canary

From Richard Sargent in *Depositions, Etc.*:
THIS PROGRAM was written for the unexpanded Vc 20 and though quite brief, it gives an excellent impression of a British Country house.

[illegible]

```

45  H0:7F
50  00:0F
60  BP=[NT00000001,00000001]
70  FORM=LT00F
80  FORM=2547C15800000000
90  FORM=00000000
100  H0:7F
110  H0:7F
120  00:0F

```

Send us your Commodore programs, enclosing a cassette — and a printout on plain white paper if possible. Each listing must be accompanied by a typewritten introduction describing the program and explaining how it is constructed. We pay £1.00 for each bug-free listing published. We cannot guarantee to return every program submitted, so please keep a copy. If you want us to return your listing you must include a stamped, addressed envelope. If you have any problems with the program, please write to the appropriate editor: Software File

Commodore Horizons 33-13 Little Newwood Street London WC2R 2LS

MAKE THE MOST OF YOUR COMMODORE

Vic Basic

A step-by-step introduction to the VIC 64 computer and its language. Vic Basic: Teach yourself how to use the Vic to create your own programmes, music and art. Also included are puzzles, exercises and games programmes. 119 pages.



The Elementary Commodore 64

A beginner's step-by-step introduction to the Commodore 64: how and how to programme. Includes BASIC and PEEK, screen formatting, text, data manipulation, arrays, editor, graphics and helpful hints. 240 pages.

Four excellent books for Commodore and Vic 20 owners which explain fully how to obtain the best results from your computer — and fun, too! Learn all about Basic, graphics, how to write your own games, how to use the useful memory location functions and learn how to programme.



Vic Games

A collection of 16 arcade-style strategy and educational word games for you to write and play. Convert your own sound, music, pictures and graphics programmes that are real fun. A must for every Vic 20 owner. 183 pages.



The Master Memory Map for the Commodore 64

Full of useful explanations and examples. This book is a guided tour of all the memory locations — places inside your computer that make it do its special work. You learn lots of uses for the Commodore 64 including how to make music, and how to create the special characters used in games. 189 pages.



Please supply book(s) indicated
I enclose cheque money order for £

Name _____

Address _____

- | | |
|---|--------|
| <input type="checkbox"/> Vic Basic: A user-friendly guide | £9.95 |
| <input type="checkbox"/> Vic Games | £9.95 |
| <input type="checkbox"/> The Elementary Commodore | £10.45 |
| <input type="checkbox"/> The Master Memory Map | £10.25 |

(Please add 50p postage by post)

ORDER TO

SOFTALK

14-15 St. James's Place, London W1P 8JF
Telephone: 01-267 8111

softalk

SOFTALK, 14-15 St. James's Place, London W1P 8JF. Telephone: 01-267 8111

for the
COMMODORE 64

BIG G

GAMES PEOPLE PLAY



MEGAHAWK

Fly the sensational MEGA HAWK through the Joyce of Time as ferocious bats and ice age predators seek your destruction. Be assured as the 4th dimension unfolds itself with awesome reality. Stretch your skill to the limit as you leave the time corridor into a new universe.



ZYLOGON

Seek out and destroy the Android. Space Platform that threatens Mars. Break down the defense of the ZYLOGONS whose huge fortress guard were after wars of relentless attackers. Fast and Furious. Full colour Isometric Projection. Machine Code - Vol France.

£8.95 inc. postage each

DEALER ENQUIRIES WELCOME

Post this coupon to :

BIG G

Buchan Way Hall, Rotherham, Rotherham, Cheeshire,
tel 0270 619440 telex 387381 GWS 77V

Please Rush me -

- ☐ **MEGAHAWK** £8.95 inc VAT
☐ **ZYLOGON** £8.95 inc VAT

Name _____

Address _____

_____ Post Code _____

I enclose cheque / postal order payable to BIG G for £ _____ or please charge my Access/Bankgiro account no _____

**P.S.S. INTRODUCE THE
FIRST OF MANY FOR
THE COMMODORE 64**

**To launch our new range of Software
we have selected the finest arcade
action and adventure from the U.S.A. Canada and the U.K.**



PATENT

For the concepts programming means, a minimum tutorial in the basic language, computer storage, devices, and networks, is a good foundation. Program examples will first be for the applications, multiple client systems, "Massware" applications.

123



CONCLUSIONS

There are people like a volcano:
jumps of giant strength. Center
points are standing you from
all sides. After there are steps
big from the sky, and to top
things off there's a mountain
upside nothing in the back.
[sings]

177

WETSON TV

The object of this game is to defend your city against an onslaught of assassinations. The different types of assassins bombard the player's city with not merely arrows to represent the attack, but also bombs.

230

WAFB-TV

You are the **JOE DAVE** Foundation Fighter and momentary pilot. The **SABOTAGE**, as also called from almost every system, have created **BIGGIE TWO**, one of your virtual planes.

Using the past year that you are given set off to liberate the **Canaan Park** of Newburyport the aggression of the last days. The last days have populated Newburyport several times. Issues which second year pair-ings in days.

CT-88



1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26

Have subject in to interview and
ask questions and compare
answers to find an opening you
in your program or you want
for the Japanese of Eng. Units
members will be necessary if you
are to succeed there will guide
you

0271-9058/00/0005-0000\$10.00/0



100

The signal all this gave us to show up tomorrow, January 26, halfway and until the falling point, but don't kill the whole.

[illegible]